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A New World Fairy Tale

THE story begins in a little Old World village with an apprentice lad listening to tales told by his elders, in the long evenings after work. As they talked, he learned of a world outside his village, and there came a sudden, half-fearful resolution to break the fetters of his narrow life, and try his fortune in a land of shining opportunity. And so the lad set forth, in his nineteenth year.

* * *

Forty-nine days crossing the stormy Atlantic in a sailing vessel; berths of rough boards; food cooked by the passengers themselves—thus in 1849 Jacob Bausch came to America—the land of his dreams. Followed disillusionment, almost complete. An epidemic of cholera in Buffalo; no work to be had; a bare existence as cook's helper and porter in a hotel; then a wood-turner in Rochester, at a dollar a day. And then a venture in his chosen field, the optical business—and utter, disastrous failure and a return to wood turning; and even an accident which threatened his livelihood. And the vision grew dim at times—but still it lived; and again an optical business was attempted, this time in his own house.

Mr. J. J. Bausch at 31 years of age

Henry Lomb joined him, and every hour was busy—yet when Henry Lomb enlisted for the Civil War, their debts just equalled their resources. And this was the net of eight years' work.

* * *

But then, slowly, almost imperceptibly, the tide turned. Under the spur of their constant striving for broader knowledge and higher standards, the partners and their sons built up a unique and lasting tradition of science and craftsmanship. Mr. Bausch designed and built the first power lens-grinding machine in America; and gradually other machines and processes were developed, scientific studies undertaken, and new products added to the already well-known eyeglass and spectacle lenses. It took many more years of patient, constructive effort, but success came at last. Exceeding all dreams of the pioneer, the great Bausch & Lomb factory stands as visible evidence of this success.

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AMERICAN JOURNAL OF OPHTHALMOLOGY

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SUGGESTIONS ON METHODICAL EXAMINATION OF THE PUPILS.

MARC LANDOLT, M. D.,

PARIS.

The importance of observing the pupil under definite conditions in its routine examination is here pointed out; and a method for making such exact observations is described. The results obtained in clinical cases by this method are reported, with graphs which call attention to the value of the method and the practical utility of such records of the pupil.

Any improvement of our methods of examination may be of value. The more precise our procedure, the more trustworthy will be the results therewith obtained, the greater, also, the clinical value of what may be inferred from them. The publication of the present paper may therefore be justified; it describes the procedure followed for some recent clinical researches on pupillary troubles, a subject perhaps often too hastily dealt with in current practice.

The first important factor to be pointed out is "light." It has been said, by an author of great authority, that "the photomotor reflex should be observed opposite a well-lit window, and a dilator reflex in a dark room. On certain days when the intensity of the light changes suddenly, owing to the passing of large black clouds, exploration of the pupil should be avoided. Moreover the examination should not be made in twilight, as then the progressive dilatation of the pupils would certainly falsify the results."

This is certainly too vague a method. It is well known that the human eye, whose sensitiveness is so great when comparing two adjacent shades of luminosity, is, on the other hand, a very inaccurate photometer.

This is due to the adaptability of the retina. The works of Hering are very instructive on this subject. It will be remembered that, among other points, he was able to demonstrate that at noon on a certain clear day, the black letters of a printed paper reflected three times more light than was reflected by the white part of the same paper at six o'clock in the morning. It is certain that the human eye would never have estimated the difference so high.

From this we must deduce that it is difficult to judge with absolute certainty whether the pupils are of normal diameter, or whether they are pathologically dilated or contracted; further, if the photomotor reflex is examined, great experience is required to judge whether it acts with normal vivacity and amplitude. This is why oculists consider that an examination of the reflex ought to be conducted in the dark room. We would insist on this detail; that the conditions under which the examination is made should be absolutely constant, as that is indispensable for the purpose of comparing different observations.

Obviously it would be desirable to examine the same pupils with various —but always known—intensities of illumination.

The second point of this paper refers to the size or the diameter of the pupil. It is perhaps not essential to know this exactly, which is doubtless the reason that has hindered pupillometry from becoming general and its instruments from being perfected. But for thoro study, especially if it is desired to compare not two cases

merely, but also the condition of the pupils of the same individual at different periods—that is, if one wishes to keep a patient under close observation —it is essential to be able to note down the results in figures.

Obviously it would be desirable to make the measurements as exact as possible. In practice, for the requirements of ordinary clinical observation, and considering the great variation in normal pupillary diameters, it seems allowable to have recourse to very simple methods. When notes are made by the same observer, they will always permit of comparison; between one observer and another the differences will only consist in the order of the size of the physiologic variations.

Simply to form estimates would not suffice, altho the same author quoted above, considers that "with a little practice it is possible to estimate the exact diameter of a pupil to within a half millimeter." He adds, and here he may be right, that one can estimate the relative diameters of the two pupils to within a quarter millimeter. This opinion apparently justifies the use of scales consisting of black circles of progressive diameters, which when placed beside the eye under examination, supply the number sought for by means of a simple comparison. The scale should be finely enough graduated, at least three circles are needed to each millimeter.

Personally, having recently had occasion to make extensive investigations, we made use of a flat sliding scale, which was placed as near as possible to the cornea, endeavoring to hold it always at the same distance away. The figures indicated by the sliding rule, graduated in tenths of a millimeter, though perhaps not accurate, were yet so within limits compatible with the requirements of a clinical examination; and doubtless the results of the same observer were comparable with one another.

Finally, to render the figures obtained by pupillometry yet more practically useful, our third suggestion is to put them down into the form of graphs.

METHOD OF EXAMINATION.

Here is the description of the method followed in taking the observations hereafter published. Against the wall of a dark room was placed a seat, provided at the back with a head-rest intended to fix each patient's head at a uniform height. The patient looked steadily at an object placed on the opposite wall at such an elevation that the line of sight made an angle of 10° with the horizontal; this obliquity was sufficient to prevent the head of the observer, seated a little lower in front of the patient from covering the object to be looked at.

At a distance of 25 cm. in front of the patient's forehead, was placed a black vertical disc, 25 cm. in diameter. Immediately behind this diaphragm, at the elevation of its center, was suspended a frosted lamp of 32 candlepower, but there was nevertheless sufficient diffused light in the dark room to permit of observation of the pupils.

A second intensity of illumination was obtained by sliding away the disc. The lamp was then exposed.

Again the lamp itself could be brought nearer the patient until it was no more than 15 cm. away, instead of the previous 30; at the same time it was lowered somewhat, so that it remained in the straight line between the eyes and its first position. This line made an angle of 20° with the horizontal.

In each of these three illuminations (A. B. C.), we could obtain for each eye three different measurements (1, 2, 3), according to whether the other eye was covered, or both eyes were open, or whether the eyes were in convergence at 20 cm. In practice the process was soon curtailed, the third reading, and very often the first, for minimum light being ignored, the three measurements for medium light were preserved, and as to the intense light, the pupils were only measured when both eyes were open and parallel.

In the graphs the initial diameter was marked on the ordinates. The inscription on the same vertical of other successive diameters would not have been sufficiently clear, so they were

marked to the right at regular intervals, arbitrarily chosen. The confusion that would have resulted from noting all the figures on the original vertical would have been particularly serious when two eyes were being compared.

Besides the physiologic reactions, the methodical examination of the pupils whose action is disordered is often completed by an investigation into their reaction to different collyria. The variations in diameter thus obtained can be added to the graphs, and the intervals of time that have elapsed between each observation should be marked on the abscissas. Each point may be made the basis of a new series of measurements, and thus would be secured a curve visibly demonstrating not only the progressive effect of the collyrium upon the initial diameter of the pupil, but also its effect on the responsiveness of the iris to physiologic stimulus.

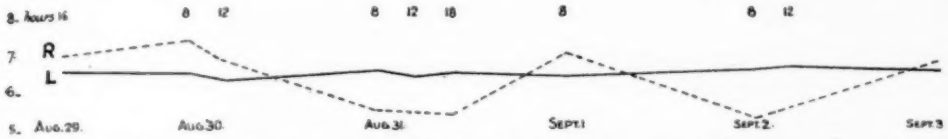

Fig. 1.—Alternating excitation and paresis of the right cervical sympathetic after trauma of the medulla.

ILLUSTRATIVE CASES.

The first case intended to show the advantages of this method, concerns a very simple instance. A soldier, as the result of a fall, was suffering from paralysis of all four limbs, thru the backward dislocation of the 4th cervical vertebra. The power of movement returned after four or five months, beginning in the right lower limb, then in the left arm, and later in the right arm and left leg. Ten months later, only slight paresis persisted in the right limbs with hyperesthesia in the region of the 4th cervical root, and some disturbance of the cervical sympathetic, particularly manifested in the pupils. The doctor who had the case under daily observation in the hospital was struck with the fact that the pupillary inequality frequently varied, so that the larger pupil was sometimes the right and sometimes the left one. He suspected a bilateral lesion, and published his observation (which was in other respects very interesting) describing the "mydriase à bascule" of his patient as due to disturbance of both sympathetic nerves.

Summoned to attend this case, we expressed the hypothesis that the variation was in the diameter of the right pupil only, which was alternately dilating and contracting. The doctor in charge remained convinced because, said he, the patient had been examined by him at precisely the same hour at the same window. As the luminosity of the sky may vary considerably without the observer being aware of it, the patient was then examined methodically several times a day on several days in succession, and the figures obtained on each occasion were noted. The graph made it clear that one of the two pupils was as good as constant, while the other alternated between states of excitation and paresis. (Curve, Fig. 1.)

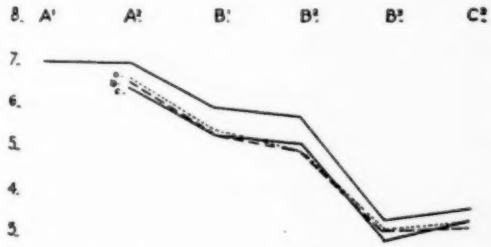

Fig. 2. Normal curves. a, b, c, the same case measured on different days. d another case.

In the curve, Fig. 2, which relates to two normal men, the starting figure A^1 indicates the pupillary diameter in minimum light, the other eye being covered. The following values corre-

spond respectively to the diameters given:

A^2. Minimum light, both eyes open.
B^1. Medium light, one eye covered.
B^2. Medium light, both eyes open.
B^3. Medium light, both eyes open, converging at 20 cm.
C^2. Intense light, both eyes open, and parallel.

Curve, Fig. 3, belongs to a case of tabes. The two pupils are even, and in a state of marked miosis; they have no reaction whatever to variations of light; stimulus to convergence alone provokes a slight contraction. Further to the right has been noted the effect of cocain on this patient: both pupils

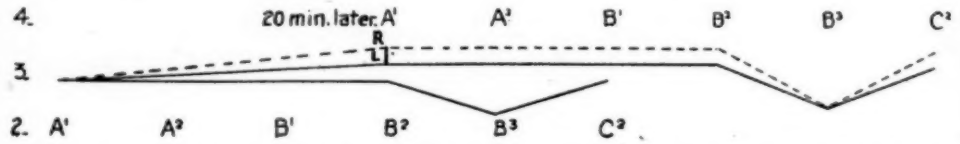

Fig. 3.—A case of tabes (miosis and Argyll-Robert son's symptom) before and after instillation of cocain.

It was first endeavored to discover which of the two pupils was pathologic: that is to say, whether the anisocoria was due to mydriasis or miosis, and then, whether the pupillary disorder was of a paralytic or a spasmodic nature.

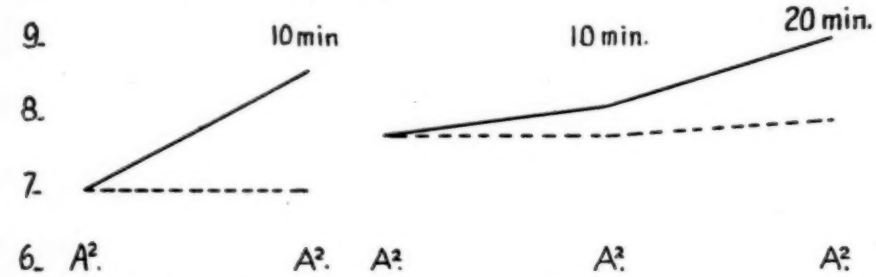

Fig. 4. Two cases of traumatic lesion of the cervical sympathetic without anisocoria. The difference of excitability is rendered manifest by cocain.

slightly dilated, tho unequally; the responsiveness has not varied.

Fig. 4 reproduces the graphs of two cases of very slight lesion of the cervical sympathetic, by wounds in war. Paresis was so little marked that there was no anisocoria. Instillation of 1% cocain showed a great difference in excitability between the two pupillary dilatators, the one reacting normally, the other, on the contrary only contracting slightly and after some delay. Here we have only noted the position A^2 every ten minutes.

An example of more extended clinical investigation will show how the graphic method may sometimes be practically indispensable, as much for the comparison of results, as for arranging the great number of data obtained. It concerns some examinations of wounded soldiers that had been trephined and afterwards showed anisocoria. (Ann. de Méd. Nov.-Dec. 1918.) The question was to find out the nature of this symptom.

Retaining the theory of the two antagonistic muscles of the iris—the sphincter innervated by the oculomotorius, and the dilatator controlled by the sympathetic—it would have been interesting from the standpoint of cerebral physiology, to discover a connection between the seat of the cranial lesion, meningitic or encephalic, and the motor centers of the pupil. This was especially so because certain neurologists have thought they could detect a particular frequency of unilateral mydriasis in traumata of the frontal region, and on the same side as the wound. Now Lewandowsky states

that the sympathetic may be stimulated by the faradization of certain points of the frontal lobe.

All preconceived notions being put aside, twenty-nine trephined subjects, who showed anisocoria, were methodically examined. The conviction arose that: 1. This symptom is just as frequent when any other part of the skull has been injured as it is in cases of frontal wounds. 2. The anisocoria may disappear temporarily in some cases. 3. Measurements of the pupillary diameters showed that both pupils might vary in dimension from day to day to a much larger degree than was the case with the normal pupil (compare the first measures in Fig. 5-6 and 7-8, with A^2 in Fig. 2).

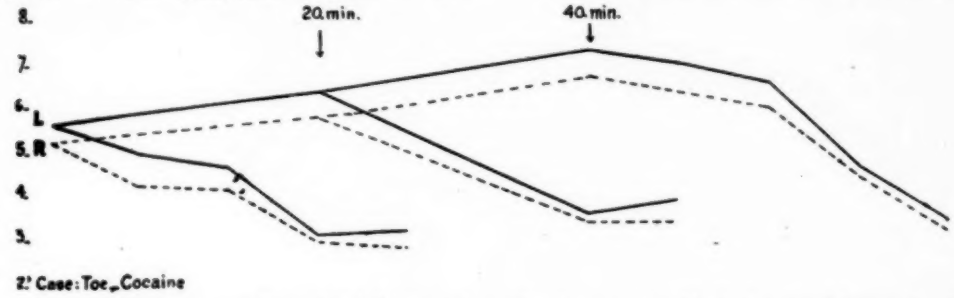

Fig. 5. Diameter of pupil, under influence of cocain, in man trephined for cranial wound of right parietal region. Vision = 10/10 in each eye. Fundus normal. Pupils larger than average.

It was therefore necessary to have recourse to collyrium tests. Cocain, by stimulating the sympathetic, caused an absolutely parallel dilatation of both pupils, even in the cases of pronounced miosis. There was clearly no paresis of the sympathetic.

The instillation of homatropin caused mydriasis on both sides; but this time there was some difference: with all the patients the larger pupil of the two seemed more strongly influenced than the other. The fact was somewhat disturbing, for in the case of pupils below the average size it might signify that the smaller of the two was in a state of spasmodic miosis, whilst in the case of patients with pupils above the average size it led to the conclusion that we had to deal with spasmodic mydriasis.

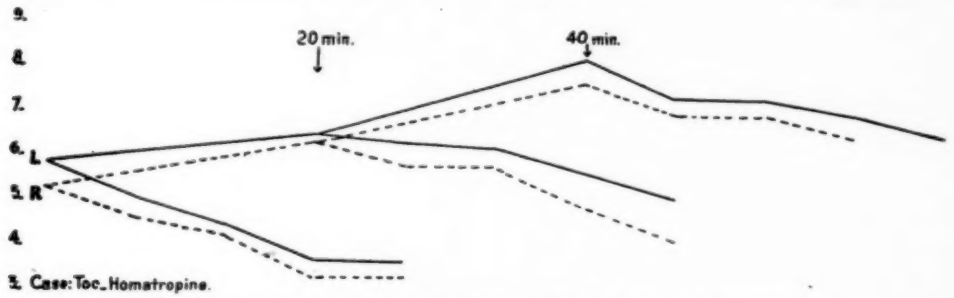

Fig. 6. In same patient as Fig. 5 under the influence of homatropin.

The comparison of a large number of graphs representing pupillary variations in different lights, established the fact that never, even in the largest pupils, notably exceeding the normal average, was there any paretic disorder of the sphincter. Contraction took place very rapidly and amply, as is shown by B^3 in Figs. 7-8.

This apparent contradiction could only be explained by ignoring all motor disturbance in the iris, and considering solely the more or less repleted state of the blood vessels.

The congestion of the iris, added to the tonus of the sphincter gave an ap-

pearance of spasmodic miosis; while relative anemia on the contrary assisted the action of the dilator, and produced the apparent mydriasis. In short, we had to deal not with disorders of the innervation of the motor apparatus of the pupil, but with vasomotor trouble.

numerous cases of cranial wounds, such as vertigo, dizziness, visual disorders, etc. Fig. 5-6 and 7-8 give two examples of anisocoria, the one from a man with narrow pupils, the other from a man with wide pupils. The diameters noted are A^2, B^1, B^2, B^3, C^2. It should be remarked that the action

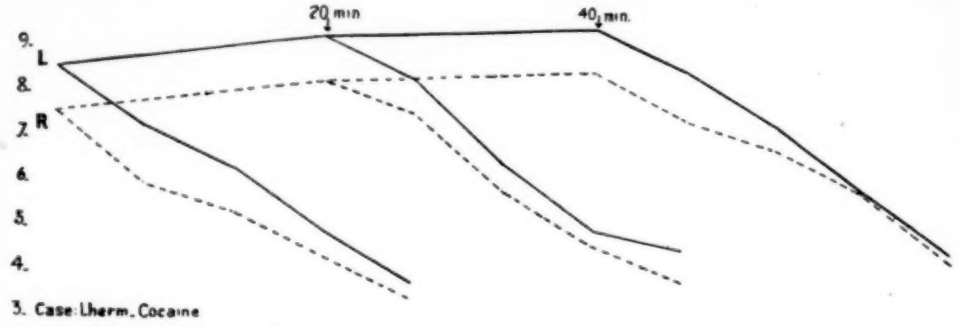

Fig. 7. Diameters of pupils above average under influence of cocain. V. =10/10 in each eye. Fundus normal.

This conclusion was interesting, for it threw light on another fact that had emerged at the beginning of our measurements: in men with mydriasis, the larger pupil was generally found on the same side as the fractured bone; but

of homatropin on the irides of the soldier Lherm. (Fig. 8) was so intense, that the larger pupil rapidly reached its maximum of 9.5 mm., at which point it remained. This man having only been measured twenty minutes

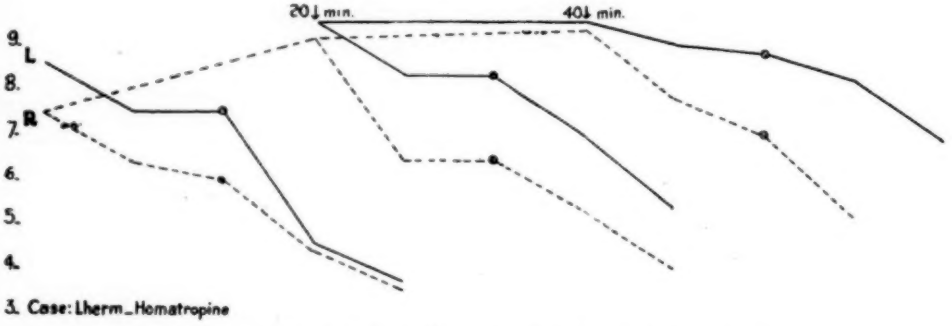

Fig. 8. Same patient as Fig. 7 under influence of homatropin.

in those who were showing miosis, it was the smaller of the two pupils which was generally found on the wounded side. There was therefore vasomotor trouble, constriction or dilatation, possibly bilateral, but predominating on the side of the traumatized hemisphere.

The conclusion also facilitated a better comprehension of a group of other subjective symptoms presented by

after instillation, it was not possible to note upon the abscissas the exact moment when the maximum diameter was reached, which prevented from tracing the first part of the curve. This, however, does not matter, because instead of points A^2, points B^2 or C^2 may be joined to obtain the profile of the curve.

A detail almost constantly observed may be pointed out: If we compare

curves 5 and 6 relating to a man with narrow pupils, with the curve of Fig. 2, we see that altho contrasts are less marked than normally because the lower limit is the same when the starting point is lower, yet the curves approximate to the normal type, B^3 being in particular smaller than C^2. In curves 7 and 8, which relate to a man whose pupillary diameters are above the average, inversion of the value B^3 and C^2 is shown from the outset; this may be a sign of spasmodic mydriasis.

SUMMARY.

To sum up, this paper was intended to draw attention to the clinical importance of a method systematically followed, and to the practical utility of noting the results in the form of curves; many interesting and new results may perhaps be expected from a wide application of the procedure here suggested.

HYPOTONY AFTER TREPHINING.

DR. ARNOLD KNAPP, NEW YORK.

This paper reports in abstract four cases in which hypotony followed trephining for glaucoma, persisting for a more or less prolonged period; and discusses the significance of this symptom. It was read before the Colorado Congress of Ophthalmology and Oto-Laryngology, August 4th, 1919.

Trephining, as well as other forms of sclerectomy, have the great shortcoming that the amount of ultimate filtration is not within our control; in other words, the amount of filtration cannot be gauged beforehand. In some cases a permanent fistula is not established, and recourse is then had to another operation. On the other hand, the effect may be too great, the filtration is too free and hypotony results. This result is not frequent; yet exaggerated filtration must lead to changes in the intraocular circulation. These changes are not well understood, and it is not clear whether an eye will bear prolonged reduced intraocular tension. The following observations are submitted as a contribution to this phase of the glaucoma problem.

CASE I. H. B., aged 60; left chronic glaucoma in January, 1913. Sight, L. 6/200+3+1c. 75°=20/200; T 32. After trephining choroidal detachment; November, 1913 T 10; October, 1914 T 10; February, 1919 T 10; S.=20/200. Field unchanged.

A tension of 10 for six years without bad effect on vision or media.

CASE II. F. S., aged 56; chronic glaucoma right and left. Sight, R 3/200, L 6/200. T. 60 each. Trephining, February, 1913; choroidal detachment O. D.; November, 1913 T 4-5; December, 1914, R. 2/200; T 2, L. 6/200 T 4; October, 1915, R.H.M. T 2; L 5/200 T 5; September, 1916, R. L. P. Opac. lentis; L. 3/200; April, 1918, Right cataract P. L., L 3/200, T 8; August, 1918, R. iridocyclitis; November, 1918, L. 1/200 cataract developing; July 1st, 1919, R. cataracta accreta, phthisis bulbi; L. Cataract mature, field normal.

During six years tonometric reading of 2 in one eye and 6 in the other. The former slowly developed iridocyclitis, cataracta accreta and phthisis bulbi. The other eye now has a cataract with good light perception and ocular tension of 6.

CASE III. S. Y, aged 58; Chronic glaucoma, R. and L. Sight, 20/40 in each eye. April, 1913, trephining. January, 1914, T. R. 5, L. 8; January, 1915, T. R. 4, L 8; April, 1916, R. 20/40, L. 20/30; R. 6, L. 7; January, 1919, R. 20/50, L. 20/40, T. 6 each.

After five years tension of 6 in both eyes without any deterioration of vision or change in the eyes.

CASE IV. C. T., aged 73; left chronic glaucoma, R. absol. glaucoma; Sight L.—4—1.5 c. V. 20/40; T. 31-36. Trephining left, June 16, 1915, followed by detachment of choroid which persisted

until September 15th, 1915. October, 1915, 20/70; T. 8. February, 1916 beginning opacity (posterior cortical) in lens. April, 1916, T. 8; February, 1917, 10/200; July, 1917, 4/200; April 10, 1919 St. id.

The choroidal detachment after operation persisted for three months, a tension reduced to 8 for four years, with gradual development of cataract.

The operation performed in these cases was the usual one following the directions laid down by Elliot. A two mm. trephine was used in the first three, and a 1½ mm. in the fourth. A large ectatic scar resulted in all. A choroidal detachment was observed in the course of three of the cases. The ocular tension measured in these six eyes at a period varying from four to six years after operation; 2, 5, 10, 4, 8 and 8. In 3 of these, namely those measuring 10, 4 and 8, there is no loss of sight and ocular change. In one with a tension of 2 the eye is lost from phthisis bulbi. In one with tension of 6 there is a mature cataract with normal light projection and in one with tension of 8, a posterior cortical cataract is developing.

Elliot (T. O. S. U. K., p. 239, 1918), says that artificially produced hypotony is not necessarily of pathogenic significance. He has observed patients for years with marked hypotony following trephining who have maintained good vision and clear media. A cataract developing in a trephined eye, is not necessarily due to the hypotony.

I cannot agree with this view that prolonged hypotony is harmless. In one of the cases just described, one eye was lost from phthisis bulbi, and the other eye has a mature cataract with an ocular tension of 6. It seems to me that too free filtration is as much to be avoided as none at all, and that hypotony and late infection are real dangers to the trephined eye.

It should be our desire to obtain just enough filtration to keep down glaucomatous tension. Collins is in favor of limiting the size of the trephine hole. Elliot, in his recent book on glaucoma, recommends a two mm. trephine, cutting off only the corneal half of the disc. A varying amount of the disc must thus be excised, according to the amount of desired effect. I feel that a smaller trephine cleanly removing the entire segment, is a better procedure, notwithstanding the possible difficulty of dealing with the iris thru a small opening.

OCULAR MANIFESTATIONS IN CEREBELLAR SYPHILIS.

W. GILFORD DICKINSON, B.S., M.D.,

SYRACUSE, N. Y.

This paper calls attention to the various types of ocular manifestations that accompany cerebellar syphilis, and discusses their diagnostic value. It also reports in detail a striking but somewhat anomalous case occurring in a relatively young patient.

Cerebellar syphilis while actually but a special clinical manifestation of syphilis of the central nervous system, is yet sufficiently well defined to merit a separate classification, and the increased frequency with which it is being encountered, has justified the use of the term. Many different types of the condition are met with and these could be further subdivided, and no doubt will be, in the future; special attention being paid to the organs or groups of organs which are responsible for the symptomatic phenomena, both subjective and objective.

It is not the purpose of this article to cover a field so colossal, but to call attention to the various types of ocular manifestations as to their diagnostic value. By far the larger number of cases reported have been predominated by ophthalmoplegias of the external muscles, and by pupillary dyscrasias. In connection with these same is usually found some pathologic change in the fundus. Where the external ocular muscles are involved in syphilis of the central nervous system the lesion is usually basal, and the third nerve is the one most frequently involved tho this is not always the case, as autopsies on such cases have demonstrated that the lesion may be found at widely variable points, the symptoms as produced being due to a toxemia which seems to have a predilection for the nuclei of the oculomotor nerves.

Pressure paralyses, whether due to gummata, tumors, exudate or periostitis are apt to be progressive, of long duration, and to affect more than one muscle, while toxic paralyses are transitory, of short duration, and tend to attack single muscles. It is rare indeed to find a well defined case of cerebellar syphilis which does not offer somewhere in the course of the disease either palsies of the external ocular muscles or pupillary changes or both, and for this reason in the past many such conditions were falsely classified. Yet this is perfectly possible, as a localized posterior cerebellar meningitis will appear at the autopsy table. Ataxia without ocular paralyses has been noted by many observers and while often found to be due to tumors, (1), it can readily be associated with syphilitic lesions of the cerebellum. When ataxias of this type are associated with occipital pain, tumor of the optic thalamus must be suspected (2), as it is seldom that pain is found in cerebellar syphilis.

Changes in the color sense (3) are so rarely met with in this condition and are so closely allied with the psychical disturbances, that their diagnostic value is doubtful. Where they are present, the condition is one of multiple cerebral lesions, cortical, or at some point on the pathway between the cerebral cortex and the retina.

Anomalies of the fields of vision are quite constantly found in connection with cerebellar disease, and must be attributed to an associated lesion of the optic pathway, or cerebral cortex, or to a secondary toxemia; and they must be distinguished from the reductions and scotomata seen in other affections of the central nervous system. A diagnostic feature of importance is the great tendency toward homonymous reductions of the peripheral portions of the temporal fields, absence of central scotomata and failure of permanent lesions. Relative scotomata may, and in fact often do, appear from time to time during the course of the disease; but permanent, or long standing scotomata are rarely met with in cases of homonymous field reduction.

As a rule the media will not be found to be affected unless there is some in-

tercurrent disease of the vascular system, and tho this is common in most forms of luetic disease, it seems to be uncommon in the type here considered. In a series of fourteen cases presenting ataxias of pure cerebellar type, and showing positive Wassermann reactions in which the writer had opportunity of fundus examination, in a French Hospital for venereal cases, only three presented opacities in the media, tho of course it is quite possible that the others may have been so affected at some course of the disease. At any rate it would seem that such changes in the media if present are, like the other ocular manifestations in this cerebellar type, transitory.

Concerning the pupillary reactions, it may be briefly stated that the pupils in cerebellar disease react as a rule, to light and accommodation; which is in exact opposition to the familiar pupillary symptoms in cerebral and spinal syphilis.

Any type of retinitis may be met with, but the majority of observers agree that the retinal lesions are of lesser extent and shorter duration than those found in primary ocular syphilis, or in cerebro-spinal types. The areas of degeneration are usually small and situated in the more vascular portions of the retina, thereby being less destructive to the patient's vision, and also having a greater tendency to recover, because of the better nourishment of the part. Whether the majority of cases have degenerative retinal changes in both eyes as seen in the case here reported, the writer is unable to state, as literature covering this phase is not at present available.

Optic nerve changes are quite constantly found, varying from mild degrees of papillitis to well advanced choked disc. The usual picture is a moderately swollen nerve, the margins obliterated, and the color pale red or reddish gray. The lesion is nearly always bilateral, and of a similar degree in either eye. It undergoes few changes over a rather long period of time, and very often shows marked improvement under treatment. In stubborn cases or those where treatment is not available at the proper time this condition becomes aggravated and passes gradually to nerve atrophy. The atrophy is not necessarily complete, these patients often retaining a useful degree of vision for many years. The following illustrative case is reported:

CASE.

Mrs. L. was a Hebrew, age twenty- Family history negative. Patient had always been in excellent health during her youth. Married at the age of twenty-one. After two months she was infected by her husband who had, at that time, an active hard chancre. The patient did not realize that it was anything serious, and received no treatment.

Thirty-six months after the primary lesion, the patient began to experience slight dizzy attacks which gradually increased in severity and frequency until she was ataxic to the extent that walking alone was impossible. At this time the case was diagnosed and antiluetic treatment at once instituted. It was during this period of intravenous therapy that the patient first noticed that her vision was becoming less acute. This rapidly progressed until vision was reduced to light perception, and the counting of fingers at twenty centimeters.

When seen by the writer, thirty-six months had elapsed since the infection, two months since the first antiluetic treatment, and two months since the failure of vision. Examination at this time gave the following information:

General Condition. Patient, female, well developed, height 5 ft. 6 in., weight 145 lbs. Ataxic to the extent that assistance is needed in walking. Marked Romberg. Knee jerks greatly exaggerated. Ankle jerks present, about normal. No Babinski. No clonus. Cutaneous sensation diminished over anterior surfaces of forearms, elsewhere about normal. Reflexes of upper extremities slightly increased.

Ocular Examination. Careful external inspection disclosed nothing that would lead one to suspect the condition. The external ocular muscles functioned equally and normally

in all respects. There was no apparent abnormality in either the orbicular or palpebral muscles. The pupils were round, equal, and reacted well both to light and accommodation. The corneal curvature was practically equal in all meridians. The cornea, lens, and media were quite clear and transparent, a most rigid inspection failing to find evidence of any opacities.

The fundus of the right eye showed a well advanced papillitis, the outlines of the disc being no longer discernible, and a plus 2 D. lens being necessary to see the vessels clearly. Yet there was not the smooth shelving decline, which is so often seen in cerebral tumor and in increased intracranial pressure cases. The loss of outline of the disc margin in this case probably was due to a swollen retina rather than to an actual increase of the surface of the papilla.

There was a slight venous engorgement and some tortuosity of the superior temporal and nasal arteries. There were also present four minute retinal hemorrhages, the largest of which was but one-half the diameter of the superior retinal vein. The general color of the central portion of the retina was reddish grey, and in a few places it was sufficiently swollen so that the smaller branches of the arteries were here and there buried from view for spaces of half a millimeter.

About half way between the disc and the macula there was a triangular shaped area of retinal degeneration, resembling somewhat in structure the stellar shaped formations found in albuminuric retinitis but which differed not only in shape but also in that each structural element of the triangle was very highly refractive, reflecting the light as though it was a silvered mirror; also each element in the triangle was practically parallel with every other one. The macular region was exceedingly dull, reflecting the light but poorly.

There were no evidences of arterial degeneration as are so often seen in syphilitic retinitis, as white scales or plaques along the course of the arteries. The entire peripheral portions of the fundus seemed to be normal in all respects as seen with the ophthalmoscope. Perimetric examination was negative, the fields being of fair size and of normal outline. No scotomata were present either central or peripheral.

One of the interesting features of this case is the fact that the left fundus presented a picture almost identical with that seen in the right. The degree of retinitis and papillitis were, as near as observation could determine, the same. The coloring of the retina was the same, the tortuosity of the arteries and engorgement of the veins were of equal degree with that in the right eye, and even the triangular area of retinal degeneration was apparently identical in size, shape, location and refractive brilliancy.

Treatment and Progress. The patient has continued under the care of her family physician, who has kept her on a rigid course of antiluetic treatment. Local ocular therapy is limited to keeping the eyes at rest by means of atropin and a protective glass.

At the end of fourteen days a second examination of the fundus showed a very marked reduction in the papillitis, the surface of the optic nerve being plainly visible with the ophthalmoscope at open sight hole. The circumference of the disc, however, was not sharply defined from the surrounding retinal tissue. The retina also had undergone a reduction in the swelling which was seen at the last examination. The blood vessels were no longer apparently imbedded, but lay free on its surface.

At this time also the patient's ataxia had improved to the extent that she was able to walk unaided, tho her gait was unsteady and her station slightly swaying. Her vision at this time had improved greatly, as she was now able to distinguish large objects at six meters, and by a comparative scale she could be said to have about 6/60 V in the right eye and a little better in the left. No attempt was made at this time to take the corrected vision as the extreme nervous condition pre-

cluded the proper cooperation by the patient. There was no change at this time in the triangular areas of retinal degeneration, as to size or shape, but they appeared to be less highly refractive.

At the end of another two weeks' period the patient was again examined, and no appreciable change noted in the fundus of either eye. Her gait was improving and she had gained weight. An attempt was now made to correct the refractive error with the following results:

Right

Manifest H .....1.37 D.
Latent H .....2.62 D.

Total H .....4.00 D.

Left

Manifest H .....1.50 D.
Latent H .....2.12 D.

Total H .....3.62 D.
H. 0.62 D., Ax. 100°. V. equals 6/12.
H. 0.62 D., Ax. 90°. V. equals 6/15.

Muscle balance and color perception were normal at this time. Perimetric examination revealed no central scotomata, but showed a reduction in each temporal field of vision of approximately thirty degrees. No glass was prescribed at this time, as improvement appeared to be steady and rapid.

At the end of twenty more days, the examination revealed no further change in the fundus of either eye, as far as could be seen with the ophthalmoscope. Careful perimetric charts at this time showed that the reduction in the temporal fields which appeared at the last examination was no longer present, but the entire field was now normal. The patient now accepted the following correction:

R. +3.62+0.62 c. ax. 100° V. 6/6.
L +3.50+0.62 c. ax. 95° V. 6/9.

Patient's gait at this time was still uncertain, but she walked without assistance. Other symptoms of cerebellar disturbance which still obtained were: faulty station, disturbed reflexes, adiadokokinesis, slight speech defect, some emotional disturbance. All these symptoms, however, are improving.

In conclusion it might be said that this case is of unusual interest from the ophthalmic viewpoint because of:

1. The comparative youth of the patient.
2. The rather long period of time which elapsed between infection and the observation of ocular symptoms.
3. The absence of any pupillary changes.
4. The relatively identical fundus picture in either eye.
5. The absence of abnormalities in the external ocular muscles.
6. The rapid improvement of the ocular condition.

Whether the injections of salvarsan in such close succession were the cause of the ocular disturbances cannot be definitely proved. There have been many cases reported where ocular symptoms have been produced by salvarsan, or at any rate were seen synchronously with its use. However it is the writer's opinion that where all the symptoms of definite cerebellar disease are present, together with structural changes in the retina, one is safe in attributing the ocular changes to the same cause as this cerebellar disease.

The symmetric reduction of the temporal fields of vision, occurring late in the progress of the malady, is rather difficult to interpret. Yet it can be fairly definitely stated that such symmetric contractions of the temporal fields is proof of disturbance by pressure or toxins of the crossed fibres in the optic chiasm. Only rarely has this contraction been attributed to lesions of other portions of the tract. It would seem in the above case to be due to a toxemia rather than pressure, because of its short duration, and failure to produce a permanent lesion.

The actual pathology of the cerebellum in such a case as this can only be proved at autopsy. However tumors and gummata can, with a mild degree of certainty, be ruled out, in as much as such are apt to produce ophthalmoplegias at some time during their course. Even if such a lesion was present without the typical external muscle palsies, its effects would hardly

be as transient as those seen in this case.

Such fleeting ocular manifestations are generally the result of some toxic agent, as are the cerebellar symptoms in mild cases where the picture is one of syphilitic periostitis or even localized meningitis, and it is the writer's opinion that such is the case just reported.

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EXPERIMENTAL PRODUCTION OF IRITIS AND ITS TREATMENT WITH FOREIGN PROTEIN.

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This paper briefly reviews the varied etiology of iritis, and the good results claimed for its treatment by different serums. It then reports a series of experiments performed upon rabbits in the Departments of Ophthalmology and Bacteriology in the University of Minnesota, to produce iritis of a definite severity, and observe the effects upon it of treatment by the injection of whole milk, concluding we may expect good results from this treatment where no definite positive focal infection is recognized.

The etiology of iritis has for many years occupied a prominent place in the literature. Reber (1) in a very complete review finds that most authors attribute a large percentage of the cases to syphilis (30 to 60%) and the remainder to rheumatism, gonorrhea, scrofula, tuberculosis, autoinfectious diseases, disorders of metabolism, and traumatic and sympathetic causes.

He states that with modern laboratory methods, such as the complement fixation test, five organisms could be identified as sustaining a causative relation to iritis. These are the spirocheta pallida, the gonococcus, the pneumococcus, the tubercle bacillus, and the influenza bacillus.

Each of these varieties responds quite well to specific treatment but the iritis of nonspecific characterization and obscure etiology, which resists ordinary therapeutic measures and in which class the so-called rheumatic iritis properly belongs, is the type which appeared to the writer as one which would offer an excellent field for the exhibition of foreign protein therapy, and it was with this in view that he has attempted the experimentation which forms the basis of this paper.

Brown and Irons (2) report a series of 100 cases giving as the chief causes not one but several factors, i. e., focal infections of the mixed type.

Poynton and Paine (3) isolated a diplococcus and experimentally produced an iridocyclitis which was rearded as a true rheumatic iritis.

These observations were confirmed regarding acute rheumatic iritis by Rosenow (4).

Marked improvement in the treatment of hypopyon keratitis by the use of bacterins is reported. The pneumococcus was used by Römer. (5) He also used autoserum therapy, the serum being obtained from a blister on the patient's arm.

Antistreptococcus serum has also been employed, as has also antistaphylococcus serum. Darier (6), Zimmermann (7), and Fromaget (8) have used antidiphtheric serum with success. Deutschmann (9) reports good results from the use of yeast serum, and the results from the use of bacterins and vaccines by de Schweinitz (10) have been of "surprising value."

Evidently the employment of such a great variety of serums indicates that it is not the specific antibodies in the serum which is responsible for the improvement noted, but rather it could be more clearly attributed to the protein content of the serum. If this be true, it would remain for the experimenter to find a single protein or protein-containing substance which would give the best antibody liberation for the infection in hand.

A good report of the clinical use of foreign protein in eye infections is that of Müller and Thanner (11) who used whole boiled milk. They report very favorable results in eleven cases of primary iritis, the cause of which was ascribed to rheumatism; two cases of gonorrheal iritis; four cases of parenchymatous keratitis from inherited syphilis showing no improvement from specific treatment; and one case of gonorrheal conjunctivitis.

Now, when we come to consider the treatment of experimental iritis with foreign protein, we find that there has been, up to the present time, practically no work reported, and we are at once confronted by two problems: first, that of localizing the infection in the iris alone, and, second, that of producing a similar degree of infection in one or more animals at the same time. It was exceedingly difficult to devise a technic by which the infection could be entirely localized in the iris, for the majority of the cases of iritis were accompanied by a more or less severe conjunctivitis, in spite of the use of every precaution to prevent the latter.

EXPERIMENTS.

The following procedure was finally developed with a fair degree of success. With a fine hypodermic needle, puncture was made at the corneoscleral margin, going into the base of the iris and as close to the anterior surface of the iris as possible. Then, .05 to .1 cc. of a suspension of the bacteria in salt solution was injected, the needle rapidly withdrawn, and the eye thoroly washed with boric acid solution.

The other difficulty consisted in producing the same degree of infection in two or more animals, and many series which were started had to be abandoned because of inability to produce the proper control. In the series of cases herein reported, where there existed a difference in the severity of the infections, I used the severest cases for the treatment and the less severe for the control, and thus no advantage for the treatment could be claimed that was not justly due it.

The organisms used were staphylococcus aureus, streptococcus hemolyticus, and streptococcus viridans. Often the inoculations were repeated several times, in spite of the fact that the organisms were very pathogenic for the human, being taken from cases of septicemia, otitis media, and from the dental pulp of extracted decayed teeth. There appears to be quite a high resistance in the iris of the rabbit, altho the fact, that organisms can be recovered from injections of septic material into the anterior chamber of a rabbit's eye, when growth can be obtained in no other way, is well known.

The following series serve to illustrate the results of the treatment, and, of course, the results must be interpreted upon objective signs alone, which may or may not be a disadvantage.

SERIES I.

Rabbit #3 (control).

Feb. 3. Injection staph. aureus into left eye.
Feb. 4. Severe iritis.
Feb. 12. Iris beginning to clear.
Feb. 14. Further improvement.
Feb. 18. Eye cleared up.

Rabbit #4.

Feb. 3. Injection staph. aureus into left eye.
Feb. 4. Very severe iritis.
Feb. 7. Intravenous injection 1.5 cc. whole boiled milk.
Feb. 8. Improvement.
Feb. 9. Iris clearing.
Feb. 12. Eye cleared up.

Rabbit #5.

Feb. 3. Injection staph. aureus into left eye.
Feb. 4. Severe iritis.

Feb. 5. Intravenous injection 1 cc. whole boiled milk.
Feb. 7. Marked improvement.
Feb. 9. Eye cleared up.

In this series it will be noted that in the treated animals the course of the infection was shortened by one third and one half the time, respectively, of the untreated animal.

SERIES II.

Rabbit #17 (control).

March 5. Injected staph. aureus into right eye.
March 6. Severe iritis.
March 7. Panophthalmitis.
March 8. Rabbit died of meningitis.

Rabbit #18.

March 5. Injected staph. aureus into right eye.
March 6. Severe iritis.
March 8. Injected 1 cc. whole boiled milk intravenously.
March 9. Improvement.
March 11. Animal very sick.
March 15. Rabbit died of meningitis.

The treatment in this series might be said to show some temporary beneficial effect, but it is doubtful.

SERIES III.

Rabbit #21.

April 2. Injected streptococcus hemolyticus into right eye.
April 3. Moderately severe iritis.
April 6. Intravenous injection 1 cc. whole boiled milk.
April 7. Marked improvement.
April 9. Eye cleared up.

Rabbit #22 (control).

April 2. Injected strep. hem. into right eye.
April 3. Moderately severe iritis.
April 8. Some improvement.
April 13. Condition same.
April 17. Further improvement.
April 18. Eye cleared up.

SERIES IV.

Rabbit #32 (control).

May 6. Injected strep. hem. into left eye.
May 7. Severe iritis.
May 9. Condition same.
May 13. Improved.
May 14. Animal quite sick.
May 18. Animal died of meningitis.

Rabbit #33.

May 6. Injected strep. hem. into left eye.
May 7. Severe iritis.
May 10. Animal very sick.
May 13. Much improved.
May 15. Injected 1 cc. whole boiled milk.
May 20. Eye cleared up.

SERIES V.

Rabbit #39.

May 20. Injected strep. hem. into right eye.
May 22. Severe iritis.
May 26. Intravenous injection of 1 cc. whole boiled milk.
May 27. Improved.
May 31. Injected 1 cc. whole boiled milk.
June 2. Eye cleared up.

Rabbit #40 (control).

May 20. Injected strep. hem. into right eye.
May 22. Moderately severe iritis.
May 26. No change.
May 31. Condition about same.
June 2. Improved.
June 4. Eye cleared up.

In this series the treated animal had a much more severe infection than the untreated animal. The course of the infection was two days shorter than in the untreated animal.

SERIES VI.

Rabbit #46 (control).

May 23. Injected strep. viridans into right eye.
May 24. Severe iritis.
May 28. Condition unchanged.
June 2. Improved.
June 8. Eye cleared up.

Rabbit #47.

May 23. Injected strep. viridans into right eye.
May 24. Very severe iritis.
May 28. Injected 1 cc. whole boiled milk intravenously.
May 31. Marked improvement.
June 4. Eye cleared up.

In this series the course of the severest infection was shortened four days.

Thus it would seem that the results which have been obtained indicate that the course of the disease or infection is materially shortened in some instances,

and only slightly influenced in other instances. but when we remember that in the latter, without treatment, we could rightly expect the course to continue much longer, even twice as long, since the severity of the infection was twice as great as in the untreated cases, we can safely assume that the results were not negative.

Furthermore, I believe that the results are sufficiently encouraging to warrant the trial of foreign protein therapy clinically in certain cases of iritis. It would undoubtedly be applicable in certain selected cases which resist ordinary forms of treatment, in which the etiology is indeterminable, or in those cases which are of the so-called rheumatic variety.

It is possible that a more suitable protein mixture than whole milk could be used. There is a wide variation in antibody response to different proteins as has been demonstrated by S. F. Herrmann (12), who showed that such proteins as human serum, typhoid vaccine, human ascitic fluid, and guinea pig serum were good antibody producers.

Milk has the distinct advantage of being convenient and easily accessible, but such an advantage should not militate against the use of more perfect protein mixture, and further experimentation on this point should be done.

CONCLUSION.

The foregoing series appear to substantiate quite well the conclusion that there was a definite response to the treatment, and, while the series are not sufficiently extensive to merit general acceptance, yet I firmly believe that the principle involved is based on scientific facts, its practical exhibition has been quite definite and clear cut, and, moreover, we have a right to expect good if not excellent results in those cases of iritis in which definite foci of infection cannot be found or demonstrated.

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ATYPICAL COLOBOMA OF THE IRIS AND CHOROID.

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OMAHA, NEB.

The case here reported is of small cornea, coloboma of the iris up and slightly out, and coloboma of the choroid, beginning above the disc and extending upward to the limit of the visible fundus. Other cases of atypical coloboma are cited with the embryonic studies dealing with clefts in the optic cup. It appears that such clefts are multiple at the start, and that the persistence of one usually disappearing early is the most likely explanation of such atypical colobomas. A bibliography is appended.

REPORT OF CASE: Stella K., aged 15, was refracted March 14, 1907, and has been seen several times since, till her present age of 27. Her left eye has vision of 20/15. Her right eye sees 20/200, not helped by glasses. The left eye is normal in appearance, except that the pupil is slightly up from the center, though it is perfectly round. The cornea is 11 mm. in diameter. The fundus is normal. The right eye has the anomalies to be described. (See Fig. 1.) The patient says this eye has been the same since birth, and neither eye has changed during our observation of them. There is no history of any such anomalies in the family. The cornea of the right eye is smaller than that of the left eye, 9½ mm. in diameter, but round. The right iris is a darker green than the left iris, and shows a diminution of the normal markings. There is a coloboma of the iris, extending up and very slightly out, nearly to the ciliary body. The pupil is bordered by a darkly pigmented stripe, which also borders the pillars of the coloboma.

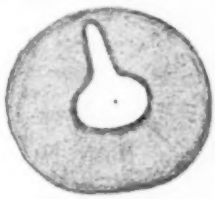

Fig. 1. Upward Coloboma of Iris. (Gifford's case).

The upper extremity of the coloboma is 1 mm. wide, the widest point at the edge of the pupil is 3 mm. wide. The iris is completely absent in the extent of the coloboma. A rim of iris ½ mm. wide is left between the upper extremity and the ciliary body. The pupil contracts to light, as does the part of the coloboma nearest the pupil, but not the upper part. The fundus (See Fig. 2) shows a coloboma of the choroid, including about 30 degrees of its circumference, which begins 5 P. D. from the disc, and extends directly up as far as can be seen with the pupil widely dilated. The borders are sharply marked by a brownish line of pigment.

Fig. 2. Upward Coloboma of Choroid (Gifford's Case.)

The border nearest the disc is rounded. In most of its extent, the coloboma is glittering white, but in the lower part there is a crescentic area marked by fine black pigment spots. A large choroidal vessel starts at the lower inner end of the coloboma, and runs up and out to near the center of the white area, where it spreads out into a broad dash of red and is lost in the sclera. A few other vessels strike across the lower half of the coloboma.

LITERATURE: As to the occurrence of just such cases as this, I have not

been able to find any other case in which coloboma of the upper half of the iris was accompanied by coloboma of the choroid in the same direction. In Hess' case (1) there was bilateral coloboma of the iris in and up, with typical coloboma of the choroid down, in the right eye only. Mittelstadt's case (2) had bilateral coloboma of the iris in, with coloboma of the choroid down and slightly in. These cases are in a different class, and will be referred to later.

I could find only four cases in which atypical colobomata of iris and choroid in the same direction were associated. These are that of Adams Frost, (quoted in Parsons) (3); in which both defects were directed out; that of Nuel and Leplat (4) out, with coloboma of the nerve also; and that of Steinheim (5) in. G. M. Van Duyse (28) this year reports a careful histologic examination of an eye showing coloboma down and in of the iris, choroid, and sheaths of the optic nerve, associated with posterior lenticonus, coloboma of the upper lid, and right-sided hare lip. The central artery entered the nerve at the nasal side, slightly down; the insertion of the internal rectus was above that of the external and the insertion of the inferior oblique was nasal to its normal insertion. While accepting as disproven Vossius' theory of a normal rotation of the eye-anlage, the author thinks the above facts make probable in his case an abnormal pushing of the upper segment temporally in its growth, which caused the fetal cleft to rotate nasally.

Coloboma of the upper half of the iris, occurring alone, is no rarer than atypical colobomata in other directions. The literature on atypical colobomata of the iris has been so well summed up by Parsons, (3) in 1906, and by E. v. Hippel in 1901 (6) that it seems worth while to mention only a few later cases, that of de Schweinitz (7) in which the defect was bilateral up and out; Yamaguchi (8) up and in; Pastega (9) up and out; Purtscher (10) up; Faber (11) up; Gilbert (12) down and in; Gilbert (12) up and in; Van Duyse, Sr. (30) in; Bertozzi (31) bilateral out; Sawitsch (32) out; Cosmettatos (33) down and out.

Atypical coloboma of the choroid alone is rather rare. Parsons has collected eight such cases, to which I can add those of Derby (13) 1907, and Roschowski (1906). These of course, do not include cases of central, or macular coloboma, but only defects in an atypical direction resembling more or less the typical colobomata downwards. The defects were up in the cases of Rindfleisch (14) and Derby (13); up and out in those of Lang (quoted in Parsons) v. Hippel (15) and Lindsay Johnson (16), (with coloboma of nerve, same eye, and macular coloboma, other eye); out in those of Pflüger (17), Nuel (Parsons) Pfannmüller (Parsons); and Roschowski (Peters (29); and down and in, in the case of Randall and de Schweinitz (18).

More interesting from the point of view of the genesis of atypical colobomata are the cases in which an atypical defect of the iris was associated with a typical coloboma of the choroid. Mittelstädt's case (2) above described, showed coloboma of both irides straight in, and of the left choroid down and in, almost at the position of a typical coloboma, the two defects forming almost a right angle. In Hess' case (1) the iris defect was bilateral in and up, with typical choroidal coloboma down in the right eye. There was a notch in the border of the lens at the site of the iris defect.

Even more significant are the cases of multiple coloboma of the iris, when taken together with recent embryologic findings. v. Hippel (6) describes an unpublished case of Leber's with three colobomata of the iris; up and in, up and out, and down and out. In Mooren's case there were two defects, one in and one out; in Manz' case, one out and one down; in Magnus' case (19) one in and one down. v. Hippel mentions also Williams' two observations of two colobomata of the iris in the same eye, but gives no further details. Parsons describes other cases: in and out (Lerche); down and in (Tortual);

down, and in (Emers). Burstenbinder's case (34) showed complete colobomata of the iris up and down, left eye, with complete coloboma in and down and superficial coloboma out, right eye. Galezowski (35) saw double coloboma, one up, and one down and out, occurring symmetrically in both eyes. Chodin (in Lindahl) saw bilateral double coloboma, each eye having one coloboma in and slightly down, and one up and out. Of interest is Jensen's case (36) isolated so far as I know, in which 2 colobomata of the iris, one down (typical) and one up and out, were associated with a choroidal coloboma in the same direction (atypical) as one of them (up and out). The latter was typical in appearance, and extended to within 2-3 P. D. of the disc. Observations in animals include the triple partial coloboma, most complete downwards, which Bock observed in a pig; colobomata down, and up and out in a fowl (v. Ammon); and three cases of Bock, in pigs; which showed, besides typical colobomata down, slight indentations of the upper pupillary margin suggesting partial colobomata up. Of these 17 cases, in eleven one of the defects was in the typical position, while in four this point could not be ascertained. In none of these cases, apparently, was the choroid involved, but multiple defect of it also has been noted in embryologic findings to be referred to.

Manz, in 1888 (20), had considered the convenience of assuming an atypical accessory fetal cleft to explain atypical colobomata, but decided that so long as evidence of such a cleft was lacking, no theory could be based on it. Since his time a good deal of evidence pointing in just this direction has been supplied.

In 1858, v. Ammon (21) had already described, in embryos of two chicks and one sheep, accessory choroidal fissures. In one of the chicken embryos, besides the typical cleft down, there was another complete, but smaller one, from nerve to ciliary body. In the second chick, the accessory cleft was complete upwards. In the sheep embryo, it appears from the cut to be not quite complete upwards, with the typical defect complete downwards. He says that Warnatz at the same time described a similar condition (in the chick?) and that Emmert had earlier seen it in amphibians. These were considered pathologic rarities, and not sufficient basis for any generalizations. In 1901, van Duyse (37) described accurately a bilateral accessory cleft in a 13.5 mm. calf embryo. The normal fetal cleft was still open in both eyes, and the second cleft, extending down and out (R. E.) and down and in (L. E.) nearly to the equator of the globe, was filled with mesoderm continuous with that outside the optic cup. No vessels were seen in the depth of the clefts. He suggested that this second cleft might remain open while the normal one closed, leaving an atypical coloboma. He suggested that such accessory clefts offer an explanation of atypical colobomata, including not only colobomata of the iris, but also of the choroid, such as those of Randall and de Schweinitz and Nuel and Leplat, and even macular colobomata.

v. Szily (22), in 1907, described a similar bilateral defect in a human embryo of about 4 weeks' growth, with model. The fetal cleft was closed in the middle in both eyes. The atypical defect in the edge of the optic cup was directed in both eyes down and in, and was of the same depth as the anterior unclosed part of the fetal cleft. In the deepest part of both clefts, sections showed a branch of the ring-artery. The author describes the normal anastomoses between the hyaloid artery and the branches of the ring-artery about the rim of the optic cup, which are fairly numerous. It is larger and more persistent anastomoses such as this, he believes, which by obstructing the forward growth of the lips of the optic cup, cause these accessory clefts or depressions. If such a vessel undergoes involution soon enough, the lip of the optic cup at the point of previous obstruction grows again, and the rim of the cup becomes smooth, as he believes does occur in many cases. If the vessel persists, however, the defect in the optic cup will also per-

sist, and may form the basis for a coloboma. He emphasizes the essential difference between such clefts and the normal fetal cleft, the former never extending past the equator of the globe. Thus they may account for colobomata of the iris, and sometimes of the ciliary body, but never of the posterior parts of the uveal tract.

In 1908, Wolfrum (23) going over his old material with v. Szily's observations in mind, discovered fairly often, in the embryos of rabbits and pigs of 13-16 mm., an accessory indentation in the rim of the optic cup. This was usually nasal to the normal fetal cleft, in the lower segment, and having no connection with it. The indentations varied in depth, involved the inner layers of the cup more deeply than the outer, and none were seen to extend past the equator of the globe. Besides these nasally directed clefts, he found in one pig embryo of 13.75 mm., a bilateral accessory cleft of a considerable depth directed straight up. These indentations appeared to be short lived, as none were found in rabbit embryos 14 days old, or pig embryos over 17 mm. in length. He found vessels in the indentations, as v. Szily did, but in the older embryos he also found these vessels passing over the smooth edge of the cup, and believed that where indentations had formerly been present, the vessels had been pushed out by the growing retinal tissue. He notes that van Duyse found no vessel in his cleft, and believes that the vessels may not present the essential cause of the indentation, but that they may simply be left in the deepest parts of the rim of the cup by the faster growing tissue at the edges of the indentations. The indentations themselves, then, may be formed when some part of the edge of the cup, for some unknown reason, lags in its growth behind the rest of the edge. (This is the same sort of argument which has arisen, as Professor Poynter of the University of Nebraska has pointed out, over the question whether or not the vessels found in the convolutions of the brain are the cause of these convolutions. I think it is generally admitted that they are not.)

Wolfrum describes Rabl's human embryo of about the fifth week, which showed, besides the normal fetal cleft, two indentations of some depth nasal to it, and another much depeer one straight up, considerably deeper than the defect down and in of v. Szily, and which must, then, have reached or passed the equator of the globe. Seefelder, in Bach and Seefelder's Atlas, 1911 (24), gives a short chapter on "Einkerbung des Becherrandes" in which he accepts v. Szily's view that the vessels are the cause of the temporary obstruction to the growth of the cup at some point. His figures show such an accessory indentation up and to one side (which side not clear from figure) in a human embryo of 5 mm. described by him. Another figure shows Robt. Meyer's 9 mm. human embryo with a similar defect straight up. Seefelder believes that when the obstruction persists, colobomata of the iris and ciliary body may be formed.

The latest contributor in this direction is Lindahl (25) (26) who in 1912 published the results of work on embryos of man, lower vertebrates, birds and the lizard. This extensive and careful work included making models from complete serial sections of 20 human embryos from 3.4 to 31.1 mm. in length, and 28 embryos of mammals, birds and the lizard at about the same period of growth. These models showed with remarkable constancy the presence of 4 distinct accessory clefts besides the normal fetal cleft. They were, aside from a few variations, arranged fairly symmetrically around the pupillary opening, extending down and in, up and in, up and out, and down and out. The cleft down and in and the one up and out were constantly found to be deeper and more persistent. Thus the pupillary opening was bounded by five rounded sides, the lower two of which later flattened out to one straight side interrupted by the slight depression of the fetal cleft. The clefts are clearly marked in 7.7 mm. human embryos, deepest at about 10 mm. and still clearly pres-

ent at 17.1 mm. In older embryos, they become shallow and rounded, till at 31.1 mm. the opening is almost round. The same was found in the lower animals examined, the depressions being less marked in birds and the lizard. In human embryos the clefts never extended past the equator, tho often a shallow furrow was seen extending back past this along the outer surface of the cup, especially in the direction up and out. The author concludes that these accessory clefts are not, as v. Szily, van Duyse, and others had supposed, merely adventitious defects occurring rarely, but that the five-sided pupillary opening with four clefts besides the fetal cleft, represents a normal stage of development. Wolfrum had already suggested, from the frequency with which he found the defect down and in in rabbit and pig embryos, that it must be fairly common, but did not suggest it as a normal stage of development. It will be noted that the defect he found most commonly corresponds to one of the two which were most marked in Lindahl's models. Lindahl suggests as reasons for this condition not having been previously noted, the fact that investigators have often cut their sections in directions which would not show these defects, that in their series many sections were often missing, and that few models have been made by the serial section method. He concludes that the presence of these clefts in fetal life, any one of which might persist from some cause, will explain atypical colobomata in any direction. Atypical choroidal colobomata associated with iris defects, he explains as obstruction to closure at a very early stage, or possibly defects of greater extent than the original cleft, similar to the typical colobomata which extend above the papilla, tho the fetal cleft never does. Bridge colobomata may be explained, he says, as a fusing of the defect at one place only.

Discussion: One important fact which seems to be made incontestable by observations of recent years is that atypical coloboma of the iris and choroid has usually nothing to do with the normal fetal cleft. The attractive theory of its rotation (Vossius) has been disproven by the discovery that the fovea is not developed in the fetal cleft (Chievitz), and by the occurrence of atypical colobomata in the same eye with typical ones. These last would also disprove the theory of an anomalous direction thruout fetal life of a single fetal cleft, at least so far as these cases of multiple defect are concerned. In G. M. van Duyse's case, the evidence is strongly in favor of an abnormal rotation of the eye, with the fetal cleft. Tho no such evidence is offered in any other cases, some of the atypical defects of the lower segment might be conceivably due to this, especially those such as Mittelstädt's, where the defect was near the typical position. There is no evidence that such rotation could explain defects of the upper segment. Deutschmann's theory of an intrauterine inflammation in the region of the fetal cleft may explain some typical colobomata, but is being abandoned even for these cases, as so many of them show no clinical or histologic evidences of former inflammation, and the frequent occurrence of a bilateral inflammation in this region alone is hard to believe. At any rate the theory will not explain atypical defects, which are independent of the fetal cleft. It was Hess' idea that persistent bands from the vascular fetal membrane of the lens caused colobomata of the iris, and that the abnormal development of the connective tissue in the framework of the eye which caused this persistence, might also obstruct closure of the normal fetal cleft and produce typical coloboma of the choroid such as he found. This is consonant with the number of cases which have had remains of the pupillary membrane present with coloboma, and with v. Hippel's conclusion (27) that mesoderm growing into the fetal cleft and persisting long enough to hinder development of the membranes is the main factor in producing typical colobomata. And a certain interpretation of this view seems reconcilable with the embryologic findings above described

in helping to explain atypical colobomata.

In view of the accumulating embryologic data, it can be certainly said that accessory clefts at various parts of the secondary optic vesicle do occur in fetal life, and that they are not so rare as has been supposed. Taken with the observations of multiple defects seen after birth, typical and atypical, it seems logical to believe that these accessory clefts may cause atypical colobomata persisting after birth. v. Szily has claimed that this could be true only of defects of the anterior segment of the eye. The mechanism of such persistent defects would appear to be most logically found, as it has been found for typical colobomata, in the pushing of mesoderm into such an indentation of the rim of the cup. It may even be that this abnormally vigorous growth of mesoderm pressing on the rim of the cup is what causes its failure to grow ahead at one point, and so produces these indentations.

Whatever the cause of the defect, persistent vessel, primary lag in growth at one point of the cup, or push of abundant mesoderm, it is certain that where such a cleft might exist, mesoderm, usually vascular, would push in to fill it. As this mesoderm later involuted, it might leave bands such as Hess described which would hinder iris growth, tho the bands themselves might later atrophy and leave no traces. While v. Szily states that the defects never pass the equator, v. Ammon's and Warnatz' cases of multiple choroidal colobomata would seem to be instances to the contrary. The defect upwards in Seefelder's 5 mm. human embryo if persistent, might cause a defect fairly far back in the choroid. Theoretically, it is conceivable that the lagging growth, whatever its cause, might begin at any stage in development of the optic cup, when it was hardly a cup at all, and that such a defect might allow mesoderm to enter the cup which would persist and cause a defect very deep in the choroid. Van Duyse and Lindahl suggest such possibilities. While this must await further evidence for proof, I know of no more likely theory with which to explain the atypical colobomata of the choroid such as that in the present case, which we know do exist with similar defects in the iris.

My excuse for presenting this case and the discussion of the literature at such length is the chance of having observed what I believe is the first case reported of coloboma of both iris and choroid up, with the fact that I have nowhere found a summing up of recent evidence, especially embryologic evidence, for what seems to be the most likely theory to explain it.

Since finishing the first draft of this paper, I have seen Lindahl's article, which covers much the same ground. It seemed, however, that it was not so generally known as to make this discussion entirely superfluous.

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MULTIPLE VACCINATION OF THE EYELIDS

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A case of this unusual complication of vaccination is here reported with comments upon it; and an extended bibliography is appended. This paper was read before the American Ophthalmological Society, June, 1919.

There are two reasons for presenting this case to you—one, that as far as the records show no such report has been given this society, and the other, that altho vaccination is common, comparatively very few eye complications are noted.

The infrequency of eye involvement following vaccination is very striking when we consider the number of vaccinations, the doubtful handling that many receive, and the ease with which infection may be transferred. This case of transference by slight contact is detailed by Clarke. He reports four members of a family slept in the same bed, after a recently vaccinated child, all but one developing vaccinia. In Schapringer's case, a physician patted the face of his patient, who later developed ocular vaccinia.

The severity of complications varies —the loss of an eye has been noted many times. One eye was destroyed in cases reported by Calhoun, Betti, Schwabe, and Doehler; both eyes by Tilly in a case of pemphigus. Corneal involvement with opacities interfering markedly with vision is described by Morax, Snydacker, Schmitz, Knaggs, and Block. Lid deformities are numerous, from the pale areas without cilia to adhesions of lid or lids to the globe. Mark reports a symblepharon, and both he and Thompson ankyloblepharon.

A review of the literature shows that altho the majority of the cases have been mild, nevertheless very serious complications may follow this seemingly simple lesion, and further that the severity of eye change does not always have a direct relation to the patient's previous history of successful or unsuccessful vaccination.

When seven years old, our patient was unsuccessfully vaccinated. A year later the result was the same.

CASE: Mrs. A. H., married, aged thirty-one years, was brought by her physician, Dr. Walter A. Reynolds, to the office September 16, 1918, with a history of having had hay fever since the early part of July, with much irritation of her eyes and intense itching.

On August 27th her young son was vaccinated on the left arm. The patient had been caring for his wound, but had always carefully washed her hands immediately after the dressing,

with the one exception of the afternoon of September 8th, when she is positive that she rubbed her right eye, without washing her hands, immediately after dressing the boy's arm. On September 12th, when she awoke in the morning, the right eye was swollen and the lids closed, which, as she says, "was like a watery blister and the pupil lay back in it." Ice compresses an ulcerating surface including the loss of the cilia, for an area of about 10x4 mm. The margins of the ulcer were not undermined, altho its base was covered with a tenacious, dirty-gray, and somewhat adherent membrane. Surrounding the ulcer was a definite zone of infiltration and the entire lid was greatly swollen and congested. The upper lid was markedly reddened.

Fig. 1. Shows distortion of lower lid, the site of the scar in the right eyebrow and the smooth surface of the left lower lid.

were used constantly. The edema entirely disappeared, altho the eye remained red and watery. The swelling, which again returned on the fifteenth, did not subside under ice, and it was impossible for the patient to even forcibly open her lids. Between September 12th and 15th she noticed an enlargement in front of her right ear. Her physician first saw her on the fifteenth, and, as the treatment had no effect on the local swelling, brought her to me the next day.

Examination—September 16, 1918: Right eye: The middle two-thirds of the lower lid margin was rough, with Congestion of the bulbar and palpebral conjunctiva with moderate blepharospasm and photophobia. A slightly stringy, mucopurulent secretion collected in the lower culdesac. Cornea clear; pupil 4 mm., regular and active. Both preauricular and postauricular glands were decidedly swollen and tender. The left eye was negative.

Two days later, on the eighteenth, a definite 6 mm. vesicle, the scar of which is evident in the photograph, was seen almost at the nasal margin of her right eyebrow. The right eye showed a greater loss of lower lid tis-

sue, with two distinct macerating areas on the upper lid margin. These were watery gray degenerating vesicles. The swelling of the entire right side of the face was considerable, but it was possible to open the lids without the use of elevators. The cornea remained clear. There was very slight conjunctival secretion, altho the grayish membrane remained adherent to the lower ulcer and the induration persisted.

The left eyelids were affected, a small 7 mm. vesicle on the upper lid, 9 mm. from the external canthus, and one on the lower lid, involving practically the outer half of the lid margin, so that the left eyelids presented the picture of the right when seen two days before.

From the first the patient complained of intense ocular pain followed by marked prostration which confined her to bed from September 20th to 30th. The temperature was but slightly elevated until the morning of September 21st, when it was 101° F. with 96 pulse and by evening reached the highest point, 102° F.

The entire right side of the face and neck was congested with intense edema, and a profuse serous discharge from the eye was present. The lower lid was so tense that the large ulcerating surface, now 25x10 mm., was in contact with the cornea, producing a slight superficial haze.

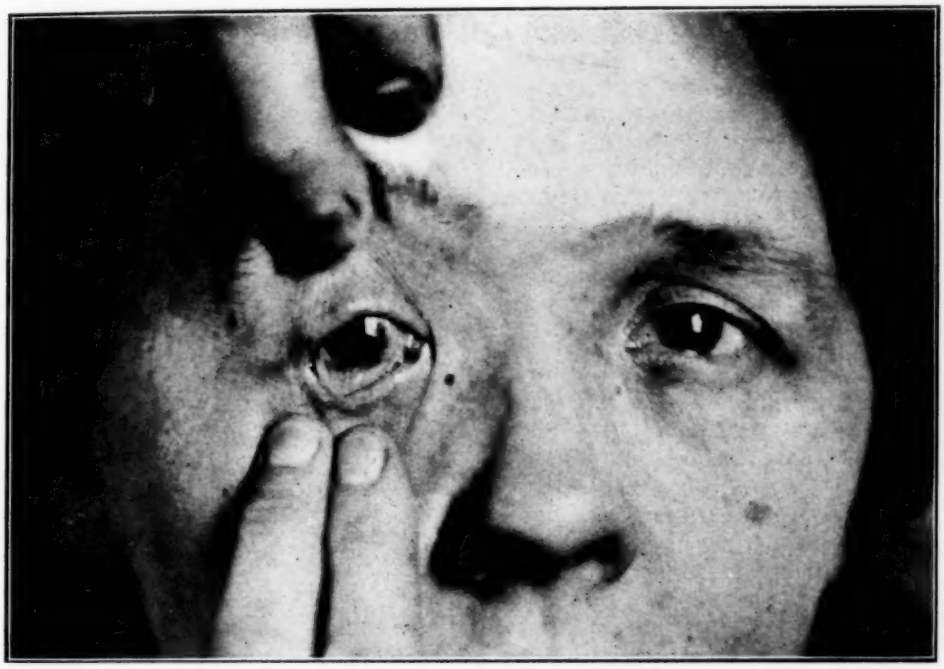

Fig. 2 Shows resulting adhesions between lid and eyeball.

The left lids were so swollen as to be blanched by pressure, while the two ulcer areas were less macerated.

On September 26th, the tenth day of observation, the firm swelling of the right temporal and malar regions was so painful that two incisions, 12 mm. long, were made, one above and the other below the external canthus. The profuse serous flow decidedly relieved the condition, altho lid elevators were necessary even partly to expose the cornea.

The vesicle in the right eyebrow was beginning to heal, and the ulcers on the left eyelids were drying, with

marked decrease of the surrounding congestion.

Two days later—the twelfth day—the right corneal opacity was greater, with interstitial infiltration. The swelling of the lids was slightly less. The left eyelids were practically healed, with the exception of a small area without epithelium on the lower.

On September 30th—the 14th day—the cornea perforated, with a minute opening 3 mm. below the apex. From that time the right eye improved rapidly. The swelling was greatly reduced each day, so that lid elevators were no longer needed to view the cornea. The glands were no longer palpable, and the pain had disappeared.

By October 1st a symblepharon of practically the entire lower lid and eyeball gave the patient much discomfort by lacrimation and photophobia. The annoyance steadily lessened, and the anterior chamber quickly reformed without iris adhesion.

On November 9th vision of the right eye was 20/200, with a diffuse corneal haze of the inferior central portion. The lower palpebral conjunctiva still remained swollen. The scars on the eyebrow and on the upper and lower left lids were smooth but still congested. The left eye: Pupil 4 mm., regular, active, disc clear, vision 20/15, and except for the two areas where the cilia are absent shows no ill effect.

On February 5, 1919, the patient was operated upon under ether. The right lower culdesac was dissected to the inferior orbital margin, two large flaps of rabbit's conjunctiva were sutured one to globe and the other to the lid. The latter held deeply in the culdesac by sutures thru inferior orbital margin periosteum and tied on the cheek. Healing was uneventful, and the result a freely movable comfortable eye.

On May 26th the patient's vision of the right eye was 20/30 (?) with correction for compound hyperopic astigmatism, full 20/30 and Jaeger 1. There was slight conjunctival injection with a tendency for the few remaining cilia at the inner canthus of the right lower lid to irritate the cornea.

COMMENT: The differential diagnosis was of considerable interest at first and later. The immediate primary thought was an initial lesion or diphtheritic conjunctivitis, the former because of the firm induration about the ulcer and the latter because of the adherent membrane. To appreciate the making of a correct diagnosis it must be remembered that neither the detailed history above recited was then obtained nor was there anything to suggest the later proved cause.

The following conditions have been confusing to others having similar cases: Diphtheria, herpes, pemphigus, hard chancre, soft chancre, malignant pustule, tuberculous conjunctivitis, erysipelas, trachoma, and gonorrheal ophthalmia.

Our diagnosis was made by the history and typical vesicles that secondarily involved the eyebrow and left lids. Blood reaction being normal, conjunctival smear not presenting Löeffler bacillus, Ducrey bacillus, Neisser organism, anthrax, or streptococcus, many of the confusing diagnoses were immediately excluded and our attention drawn to clinical proof of our diagnosis. As you all know, Guarnieri claimed that vaccinia of the cornea produced a definite cell grouping, but unfortunately this was disproved by other observers, including Wasieleuski. The only other process was to vaccinate a calf's udder and note the lesion. We were ready to do this when the patient developed the typical diagnostic vesicles, making further research unnecessary.

To summarize this case, the patient, three days after known contact, developed her first symptom; having no immunity, the infection was unusually severe, and the individual lesion, altered by the tears, was masked. Ten days after known contact the other lesions developed and they passed thru the usual stages of vaccination vesiculation with congestion and gradual drying until finally a smooth white scar remained. The corneal pressure change, extremely alarming at one time, was finally cured with excellent result, and the lid and

globe adhesion mechanically separated.

The appended bibliography, complete as far as it is possible to make it, with the books in this country, embraces all cases since the introduction of vaccination. Therefore this seems to be the ninety-third case of ocular change following vaccination.

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LOSS OF RETINAL PIGMENT (APHYKIA RETINAE).

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This paper reports a case belonging to the class of disorders of pigmentation just beginning to attract the attention they deserve. It proposes a name by which such case should be designated.

CASE: D. C., daughter of G. C., Superior, Wis. Referred by a local optician. Feb. 18, 1918. Age, 8 years, 2 months. Nationality, Scotch.

Family History: Father and mother living and in good health. No other children.

Personal History: Patient had measles at 4 years of age. Has always been troubled with earache and colds in the winter. Ears have never discharged. Has had several attacks of tonsillitis. Two months ago was quarantined for scarlet fever for a period of three weeks. Before that time had never had eye trouble.

Present Complaint: Since recovering from her attack of scarlet fever patient complains of eyes hurting and running water, also of inability to see the blackboard at school. She has had several pairs of glasses, but none have seemed to help her.

Examination: Slight congestion of lid margin, and scaling along the eyelashes. Conjunctival irritation. Pupils 2-3 mm., react promptly to light and accommodation, but slowly to convergence. Under oblique illumination, both anterior segments are seen to be normal. Vision: R., 20/100+1. L., 20/100+2. Tension: R., normal. L., normal.

Ophthalmoscopic examination: Media clear. Both retinas abnormally transparent, the tenth, or pigmentary layer being transparent as well as the nine inner layers. Choroidal vessels even to the smaller branches easily observed. Retinal vessels of normal size.

Refraction: Manifest. R., +2.00 Cyl. axis 90, Vision=20/65. L., +2.00 Cyl., axis 90, Vision=20/65. Prescribed dark glasses and atropin sulphat 1% one drop in each eye three times a day for three days and once in the morning of the fourth day. On the fourth day retinoscopic examination yielded:

R. H. 6 at 90°; H., 10.50, 180°, L. H. +6.00, 90°; H. +9.00, 180°.

Deducting +1.00 Sph: R, +5.00 Sph. ⊃ +3.50 Cyl., axis 90, Vision 20/50. L., +5.00 Sph., ⊃ +3.00 Cyl., axis 90, Vision 20/50.

General Examination: Nose and throat: Large adenoids. Tonsils hypertrophied and slightly cryptic. Hearing 20/20, right and left. Examination by family physician shows heart, lungs and urine normal.

Diagnosis: Compound hyperopic

astigmatism with *aphykia retinae,* following scarlet fever.

Treatment: The following correction was prescribed: R. +3.00 Sph., ⌒ +3.50 Cyl., axis 90°. L. +3.00 Sph., ⌒ +3.00 Cyl., axis 90°. We leave two dioptres of the hyperopia uncorrected on account of the child's age and for the reason that no glasses have previously been worn to any great extent.

Follow Up Record: April 15, 1918—Patient reports spectacles very comfortable. The vision is much better, and she is doing excellent school work. R., accepts no change of lens. Vision 20/30. L., accepts no change of lens. Vision 20/30.

Jan. 20, 1919: Though present correction has been very comfortable, there is slight headache after close work.

R., with +0.50 Sph., added to glass, Vision 20/30. L., with +0.50 Sph., added to glass. Vision 20/30.

Discussion: Before her attack of scarlet fever, the patient was able to overcome by accommodation the high refractive error. After the attack, she could no longer do so. The wearing of spectacles not only corrects the optical error, but stimulates the formation of visual purple. Hence the continued improvement in vision.

It would seem that the abnormal visibility of the choroidal vessels is owing to a deficiency of retinal pigment. The pigment was probably absorbed as a result of the toxemia. There has been no absorption of pigment from the uvea, as is shown by the fact that the wall of the eye, under transillumination, is little, if at all, abnormally transparent. A fairly careful search of the literature, including The American Encyclopedia of Ophthalmology, reveals the fact that no term has hitherto been invented to express the condition above referred to. We would therefore suggest that the words *aphykia retinae* be employed as an exact designation. We have several times noted this condition after attacks of scarlet fever, but have seen no mention of it in the literature.

Just one word as to the formation of this term. *Apigmentia,* instead of *Aphykia,* suggested itself, but was at once rejected, because of hybridity. *Pigmentlessness* would be intolerably harsh. But *aphykia* (*a,* privative; *φukos,* pigment [Giles's English-Greek Lexicon, ed. 1843, p. 875] and *ia,* condition,) is euphonic, nonhybrid, and formed by strict analogy with *aphakia,* or absence of the crystalline lens.

We deprecate the common but confusing practice of ophthalmologists who, whenever speaking of matters ophthalmoscopic, assign the pigment (outermost, or tenth) layer of the retina to the choroid. Thus, it is frequently said that "the retina is transparent," "the retina has lost its transparency," etc., and the choroid is continually spoken of as if it included the pigmentary layer of the retina. Such modes of expression, though convenient, lead to confusion of thought, and should be abandoned. When "the retina is transparent," it is only because the outermost layer of that structure, the pigmentary layer, has been absorbed.

PROLIFERATING ENDOPHLEBITIS AND RETINAL HEMORRHAGE MICROSCOPIC EXAMINATION OF EXCISED GLOBE.

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UNIVERSITY, MISS.

This paper reports in detail the histologic changes found in an eye enucleated for absolute glaucoma, as these were brought out by different stains. A Thesis submitted for the degree Doctor of Ophthalmology in the University of Colorado, 1919.

Obstruction of the central retinal vein of the eye may be due to a number of conditions, among which are included thrombosis and proliferating endophlebitis. These two conditions may be jointly responsible, or either alone. In this paper I wish to report a case which apparently should be classed under the latter, with a possibility of thrombosis also playing a part.

Mr. R. L. S., age 71, a man with marked nephritis and high blood pressure, on August 23, 1918, discovered that vision of the right eye was considerably diminished. Within three days the eye was totally blind. Two days later when I first saw him, the fundus presented the classic ophthalmoscopic picture of thrombosis of the central vein. Seven days later he developed glaucoma, and eventually enucleation became necessary.

The eye was fixed in formalin and carried thru the usual laboratory technic altho unfortunately, sectioned longitudinally. My stains include: Hematoxylin and Eosin; Hematoxylin and Eosin-Aurantia and Orange G; Iron Hematoxylin, Hematoxylin and Van Gieson, and Phosphotungstic Acid Hematoxylin.

Altho I have not been able to prove conclusively a thrombosis of the central vein, the sections are sufficiently interesting to be worthy of study. All of them show *diffuse hemorrhage* in the retina; practically all of them have an obliteration of the canal of Schlemm on one side; and most of them show decided angiosclerosis. Some show an obliterating proliferative endarteritis-endophlebitis.

I am submitting with this a number of slides and a sketch of each, with the hope of demonstrating especially the vascular lesions. The sketches merely outline some parts of the eye in order to suggest the location of other parts which are drawn in more detail and which are meant merely as a guide in finding the lesions described.

SLIDE 1: Fig. 1. (Colored plate.) In the retina are seen several blood vessels, one of which seems to be completely obliterated with proliferated endothelium. Leading from the adjacent vessel to this one appears to be a capillary which in a sense has canalized the proliferated mass of endothelium. The perivascular lymph spaces are conspicuous on two sides of the obstructing mass of endothelium. In the greatly thickened walls of the adjacent vessel are seen two capillaries which are running parallel with the vessel itself.

SLIDE 2: Fig. 2. Very much the same condition appears here that we have in slide 1. The vessel in the retina with the proliferated endothelium, however, is further away from the optic nerve and smaller.

SLIDE 3: Fig 3. Just external to the vessels described in No. 1 is seen in this slide a vessel cut obliquely which is filled with proliferated or desquamated endothelium but not so compactly as in slides 1 and 2. In the center of the optic nerve is a congested blood vessel which shows beautifully the great amount of polymorphonuclear leukocytes.

SLIDE 4: Fig 4. Near the end of the optic nerve and outside of the sheath is a blood vessel which demonstrates beautifully the proliferated endothelium nearly filling the lumen, and which appears to have budded out from one side of the vessel wall alone.

SLIDE 5: External to the sheath of the optic nerve in the loose tissue are seen two small vessels completely oc-

cluded, apparently from an increase in the subendothelial tissue and the media. The elastic tissue is conspicuous. The endothelium is replaced by vacuoles which probably are fat droplets.

SLIDE 6: Fig. 5. This slide demonstrates very clearly the marked angiosclerosis. Several vessels near the optic nerve are almost occluded with a thickening apparently of all layers of the walls.

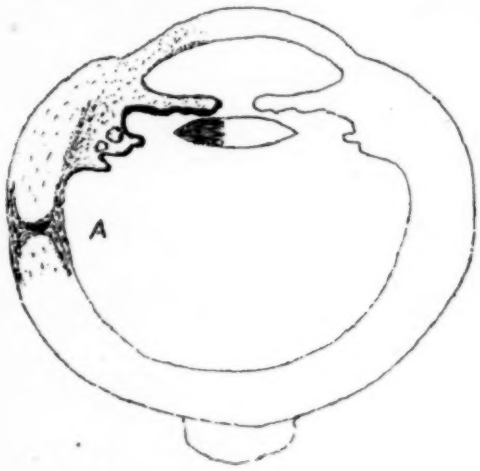

Fig. 7. Anteroposterior section of globe showing vena vorticosa at A, which is also shown farther back in Fig. 4.

SLIDE 7: Here also is a beautiful lesion of obliterating arteriosclerosis—the vessel being located at the very end of the optic nerve.

SLIDE 8: A vessel near the optic nerve is completely obliterated with fibrous tissue running across the lumen.

SLIDE 9: Fig. 6. The lesion described in slide 8 is even more marked here—the bands of fibrous tissue spanning the lumen being more dense. These last two slides suggest strongly organized thrombi.

Fig. 7 represents the vena vorticosa which is shown in slide 4. The walls of the vessel seem to show some amyloid degeneration.

SLIDES 11, 12 and 13 show repetitions of lesions described above.

In many of these slides it will be noticed that the iris has been adherent to the lenticular capsule, and in retracting has left pigment attached to the latter. This is probably due to post mortem and fixation changes. In the congested blood vessels are seen many polymorphonuclear leukocytes which would suggest toxemia, if not septicemia. There is no perivascular infiltration to be found, and this would exclude lues.

It is remarkable to note how very well the rods and cones have been preserved in an apparently healthy state, in spite of other pathologic conditions of the eye. The disc has only moderate cupping, altho in nearly every slide the filtration angle on one side, at least, is completely blocked.

CONCLUSIONS: As a summary, I wish to emphasize the obliterating endarteritis-endophlebitis and the general angiosclerosis. Probably the same toxins which caused the nephritis are responsible here for the proliferation of endothelium and subendothelial tissue. These same toxins may have weakened the walls of the capillaries to the extent that slight obstruction to the venous circulation caused a rupture with the consequent hemorrhage. It is quite possible there was a thrombus in the central vein behind the point of division. It is also possible that having the eye sectioned longitudinally, a thrombus has been missed in the mounts.

With the clinical picture as it was, and considering these vascular lesions demonstrated, I am convinced the hemorrhagic retinitis was the result of a venous obstruction due to proliferative endophlebitis, thrombosis, or possibly to a combination of the two.

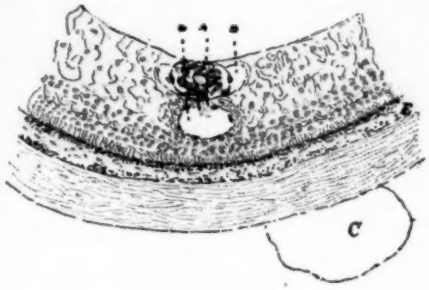

FIG. 1. A. PROLIFERATION OF ENDOTHELIUM IN BLOOD VESSEL. B. PERIVASCULAR LYMPH SPACE. C. OPTIC NERVE. D. BLOOD VESSEL. E. HEMORRHAGE.

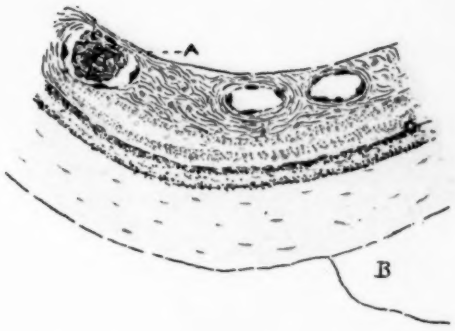

FIG. 2. A. PROLIFERATION OF ENDOTHELIUM. B. OPTIC NERVE. C. HEMORRHAGE.

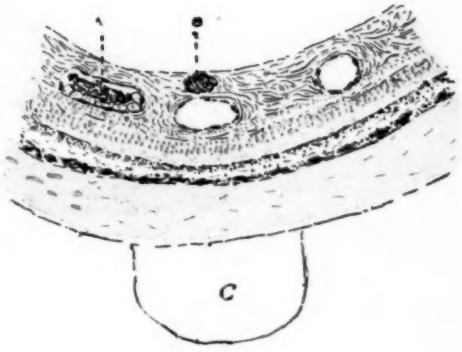

FIG. 3. A. PROBABLE OCCLUSION OF VESSEL BY ENDOTHELIUM. B. PROLIFERATION OF ENDOTHELIUM. C. OPTIC NERVE. D. HEMORRHAGE.

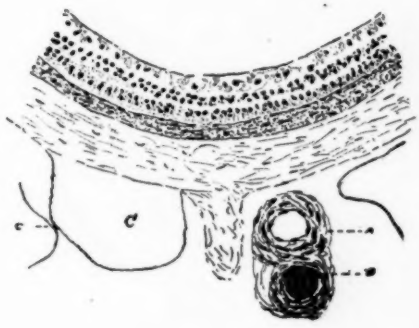

FIG. 4. A. SCLEROSED BLOOD VESSEL. B. VESSEL SHOWING PROLIFERATION OF ENDOTHELIUM. C. OPTIC NERVE.

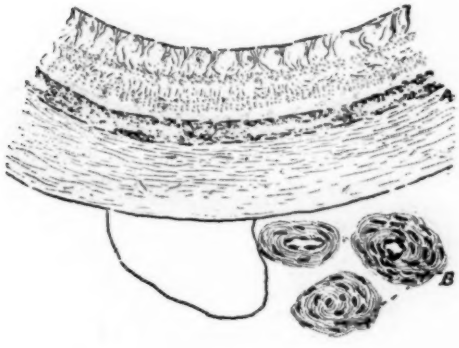

FIG. 5. A. HEMORRHAGE. B. MARKED ARTERIOSCLEROSIS.

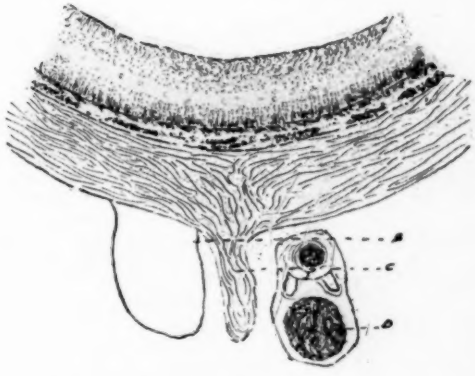

FIG. 6. A. HEMORRHAGE. B. OPTIC NERVE. C NERVE SHEATH. D. PROBABLY ORGANIZED THROMBUS.

PROLIFERATING ENDOPHLEBITIS, RETINAL HEMORRHAGE, ABSOLUTE GLAUCOMA. EXAMINATION OF EXCISED GLOBE (GUYTON).

UNUSUALLY LARGE PRIMARY EPITHELIOMA OF THE OCULAR CONJUNCTIVA.

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This case report including the microscopic examination of the specimen suggests a possible papilloma which had undergone malignant degeneration. A bibliography of recent similar cases is given. The paper was read before the Pacific Coast Oto-Ophthalmological Society, San Francisco, August 4-6, 1919.

Primary epithelioma of the ocular conjunctiva is by no means so rare that every isolated case should be reported. It is exceedingly unusual, however, for such a growth to have progressed to the size of the one recorded in the following history, and it is believed also that the case presents some other points of interest. It is for these reasons that it is herewith reported for your consideration.

J. M. married male, aged fifty-six, presented himself at the office on February 19th 1919 for a consultation regarding what appeared to be a most extraordinary ocular condition as will be seen from the accompanying photograph.

The patient was a sturdy looking rancher in apparently good health excepting the ocular condition. He gave a history of a small redish spot having existed on the temporal portion of the sclera of the right eye since early boyhood. According to his statement and that of his daughter who accompanied him, this spot began to increase in size about three years prior to the consultation; and grew to such an extent that at the time of the examination the whole anterior portion of the eyeball was so covered that no cornea or sclera was recognizable. As seen from the accompanying photograph, the growth and eyeball to which it was attached appeared to be much larger than a good-sized English walnut and projected between the lids so that the latter could not be closed. Both upper and lower lids were everted and were constantly retained in this position, the whole anterior portion of the eyeball being completely covered by the growth which was of rough, crusty formation on the surface, probably due to exposure and ulceration. No segment of the eyeball was visible. The growth measured one and three-eights inches transversely by one and one-fourth inches vertically, above and below which, when the lids were forcibly pried further open, a small sulcus could be seen from which the conjunctiva, apparently uninvolved, was reflected forward to the margin of the lids. There was considerable mucopurulent discharge, but the patient was not and had not been suffering any severe pain. No family history of growths could be elicited.

Fig. 1. Epithelioma of the conjunctiva. (Veasey.)

In the left eye there was an exceedingly small pupil, almost like an opium pupil, but the patient stated that he had been taking no medicine. The vision of the left eye was 6/12.

According to the patient, during the progress of the growth, from the time it had started until the time of

my examination, he had never consulted a physician regarding the same. He had been, and is at this time, living on a ranch not far from a small town where medical attendance could be obtained and only a few hours distant from many oculists.

The eyeball, together with the growth, was enucleated *en masse* under general anesthesia, with a considerable portion of the surrounding conjunctiva. The socket healed without complication, the eversion of the lids which was present at the time of the operation was disappearing as the tissues were contracting, but there was almost no sulcus below, as a large portion of the adjacent conjunctiva in this region had to be excised.

The specimen was sent to the Pathological Department of the University of Pennsylvania, and a report from Dr. Allen J. Smith, Professor of Pathology, is as follows:

"Sections of this eye show a fungating neoplasm, of fully 3 cm. in flat diameter and full thickness of over 14 mm., growing forward from the front of the eye, apparently covering in all, or a goodly part, of the cornea and the surrounding scleral part of the wall. It appears mainly as a papilloma springing from the subconjunctival tissue, sending forward a series of slender, branching fibrous outshoots, bearing capillaries and covered by thick envelopes of stratified squamous epithelial cells. These cells are characteristically large and columnar in shape in the depth of the envelope, close to the fibrous core, becoming flat and scale-like upon the surface of the growth. These constitute the great mass of the tumor. They do not become keratinized, do not show prickles, and do not arrange themselves in concentric nests or "pearly bodies" as commonly seen in skin growths of the same type. But that the growth is more than a conjunctival warty formation, one may be sure, aside from the massiveness of the neoplasm, by the fact that, about the borders at least, one can find distinct penetrating cords and groups of cells in the episcleral tissue below the conjunctiva proper. In the fungus mass, in the midst of the thick epithelial covering of the papillomatous cores, here and there appear small foci of necrosis of the epithelium, with collection in such situations of excess of polynuclear leucocytes (tiny abscesses). Especially near the margin of the growth in the subconjunctival connective tissue are to be seen numbers of injected capillaries, the tissue is loose and there are focal and diffuse areas of lymphocytic infiltration, from a reactive inflammation; and some of these lymphocytes penetrate at places in lines into the sclera, although there is no evidence of complete perforation and no evidence that the epithelial cells enter the sclera. In this same situation appear a few penetrating masses, islets and lines of epithelium, indicating the essentially malignant character of the growth.

"Sections unfortunately are not favorable to detailed study of the internal structure of the eye. The sclera appears generally unusually thin and dense as if stretched. There is a small ciliary body area showing, which has the appearance of sclerotic changes. Iris and lens do not show in sections examined. Retina is detached and only small bits are included, these showing a slight lymphocytic diffuse infiltration, and the tissue looks loose as if from an edema. The optic nerve fails to show its sheath, but there is an excess of small round cells in its interfascicular septa indicating some degrees of chronic neuritis."

Diagnosis: Epithelioma of the conjunctiva.

The case is very peculiar from the fact that the condition was permitted to progress until it had reached the stage shown in the photograph before any attempt was made to secure medical attention.

As previously stated, epithelioma of the conjunctiva is by no means exceedingly rare, as many cases have been reported, but it is certainly somewhat unusual for the growth to have reached the size and condition described in the above case before any operative interference or treatment has been obtained. De Schweinitz and

Shumway reported such a case before the American Ophthalmological Society at its meeting in 1913, thoroly discussing the condition and reviewing the literature. According to them, primary carcinoma of the bulbar conjunctiva is less frequent than carcinoma of the eyelid which secondarily involves the eyeball.

A matter of the utmost practical importance, of course, clinically, is their method of invading the eyeball According to some, the growths rarely penetrate the eyeball, and yet, on the other hand, competent authorities express an entirely opposite opinion. In the paper referred to above de Schweinitz and Shumway state that in fifty-three eyeballs, perforation occurred in twenty, or 37.6 per cent, and conclude that altho the cornea and sclera offer a considerable resistance to the growth of the tumor, especially if Bowman's membrane be intact, perforation does occur in a considerable proportion of cases, and especially if the growth has been present for some time. They also point out, however, that the percentage referred to above is relatively too high because the eyes examined were those in which the lesion had assumed such various proportions that enucleation was demanded. Growths that are situated at or in the neighborhood of the corneal limbus it is stated are much more apt to penetrate the eyeball than if they occur at some distance from it—a point which is of considerable importance in determining what had best be done in any given case. Should the growth be situated at the limbus and very small, it is advised that deep excision may be practiced, provided the patient can be kept under observation for a long period of time. Growths situated at some distance from the limbus may be excised with less danger of the possibility of recurrence.

Involvement of the lymphatic glands in the neighborhood occasionally occurs, but is said to be exceedingly rare. According to Parsons, the pre-auricular glands are those first affected while involvement of the submaxillary glands usually occurs later, if at all.

The literature of epibulbar carcinoma prior to the year 1904 may be found in Saemisch's article on "Diseases of the Conjunctiva" in the second edition of the Graefe-Saemisch Handbuch des gesamten Augenheilkunde,[1] and from 1904 to 1910 in an article by Heilbrun in Graefe's Archiv f. Ophthalmologie[2], and from 1910 to 1913 in the paper by de Schweinitz and Shumway[3].

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THE POSSIBILITIES OF MUSCLE OPERATIONS.

RODERIC O'CONNOR, M. D.

OAKLAND, CALIFORNIA.

This paper reports eight cases illustrating the results obtained by operations on the ocular muscles, if nonoperative treatment has been faithfully tried and a safe operation done on the right muscle. It was read before the Pacific Coast Oto-Ophthalmological Society, August 4-6, 1919.

The object of this paper is to remind those who may be interested, of the possibilities of muscle work, nonoperative as well as operative, and to illustrate by citing cases typical of each class of heterophoria. Squint cases are omitted as there is but little difference of opinion as to the proper treatment of such, and because the results are much less satisfactory than in the phorias where we expect functional improvement from accurate mechanical readjustment of the muscle balance.

The two cases of vertical deviation are from about 35 operations for such conditions. Contrary to accepted teachings on that point my best operative results have been in that class of deviations. This I feel sure is due to the safety of my shortening procedure and the almost complete absence of tenotomies. I seldom perform even a partial tenotomy of a vertical rectus and never a complete.

CASE 1. Hyper-cyclo-exophoria.

This was seen first May 1, 1908 in Manila.

MUSCLE BALANCE.—Exophoria 20; left hyperphoria 3; left plus cyclophoria 7.5. Refraction practically emmetropic.

Operation on June 1, 1908. This was done according to Todd's method but making the cuts so that the pull came from the lower end of the attachment of the left externus and in this way offer a chance of securing a triple correction. This was successful and continued so; for, somewhat over a year later, he measured absolute orthophoria in all directions.

Remarks. This case proves that a cyclophoria can be corrected by a Todd lengthening therefore it is fair to assume that one can be produced by it.

CASE 2. Hyper - cyclo - esophoria. Seen first Dec. 2, 1915.

Muscle Balance.—Esotropia 25 (left eye squinting); left hyperphoria 10; left plus cyclophoria 10.

Operation Dec. 11, 1915. This, in hopes of again securing a triple effect, consisted in one of my double hitch shortenings confined to the lower margin of the left externus. Test immediately after operation gave as follows: exophoria 1; left cataphoria 1; left plus cyclophoria 1. This for practical purposes was a full triple correction. He was seen last June 2, 1919 when he measured esophoria 4, left hyperphoria 2, no cyclophoria. His eyes were straight objectively and there were no subjective symptoms.

CASE 3. Cataphoria (left) with exophoria. Woman who had headaches for many years.

Refraction Right—plus S. 0.25 with plus cyl. 0.50 axis 100=20/20. Left—minus S 5.25 with plus cyl. 7.00 axis 85=20/50.

Muscle Balance.—Exophoria 12; left cataphoria 12; right hyperphoria 16; insufficiency of convergence, diplopia occuring at 12 inches. Rotations measured by tropometer showed defective, upward and also inward in the left eye, bearing out the noncomitant vertical deviation.

Operation Aug. 25, 1916, consisted in shortening of the left superior rectus. Sept. 11, she measured horizontal and vertical orthophoria, converged to six inches, and was able to read in comfort, headaches coming on only after prolonged near work. The permanency of this result cannot be told for she contracted pnuemonia later that same winter with fatal result.

CASE 4. Esophoria.

A student who had been compelled to give up a course in law because of an esophoria which had resisted all the usual nonoperative procedures such as exercises, prisms. Headaches were severe and continuous. Refraction Right and Left plus S. 1.25 with plus cyl. 0.50 axis 90°.

Muscle balance after wearing a monocular patch measured esophoria 7, and the patient reported entire relief from eye trouble while wearing it.

Operation August 19, 1916, consisted in a shortening of his left externus. Relief was immediate so that he could read continuously without trouble. One year later he measured one degree esophoria but was free from symptoms. He now measures the one degree and relief has been permanent. In this case failure to obtain relief by ordinary methods changed this young man's entire future.

CASE 5. Exophoria.

An attorney who complains of severe headaches except in near work. Investigation of this proved that, for near, he allowed one eye to diverge, while for distance he used binocular vision and so had his troubles. He had had three muscle operations six years before consulting me which had given him great relief for a time.

Muscle Balance.—Exophoria right 7, left 12, noncomitancy probably being the result of the operations. Inward rotation weak in left eye.

Operations: First on Aug. 8, 1917. Left internus shortened. Resulted in reducing the deviation to 5 degrees at end of month. Not enough taken up. Second on Sept. 7, 1917. A Ziegler tenotomy of left externus correcting to orthophoria, but at end of healing measured the five degrees again, being what usually occurs in all partial tenotomies that do not actually lengthen the tendon. Third on October 1, 1917. An actual lengthening of the right externus. This gave a permanent correction to esophoria one-half degree, which he maintains to present time, and has been entirely comfortable in the use of his eyes at all distances.

CASE 6. Hyperphoria.

A young lady referred to me by a rhinologist, because of severe headaches, who had found nothing in the nose to account for them.

Muscle Balance.—Exophoria 8; left hyperphoria 7; right cataphoria 7; no cyclophoria. Convergence to 5 inches.

Operation Feb. 17, 1917, a shortening of the left inferior rectus. On Feb. 21 she tested lateral orthophoria and a left cataphoria of 1. Head felt much better. May 17, measured vertical orthophoria but the exophoria was back to the original amount. However, she is using her eyes with practically no discomfort even after prolonged near work.

CASE 7. Convergence insufficiency.

Unable to use eyes for near. Has had a number of abdominal operations to cure nausea and vomiting but without success.

Muscle Balance.—Exophoria 3.5 converges to 11 inches left eye diverging at this point; no cyclophoria; no vertical deviation; left inward rotation weak.

Operation May 12, 1916, shortening of left internus. July 19, 1916 tested orthophoria horizontal and vertical and converged to 3 inches. Has comfort in use of eyes for near. No more nausea.

CASE 8. Hidden hyperphoria.

A young lady who has had headaches as long as she can remember but becoming worse lately. Several changes in glasses with no relief. Referred to me for esophoria after an attack of dizziness with blurry vision.

Muscle Balance.—Esophoria 3; no vertical deviation and no cyclophoria. This on May 12, 1919. Refraction: Right—plus cyl. 0.25 axis 75°. Left—plane.

A patch was ordered on left eye with the idea of developing a latent esophoria in excess of the 3 degrees. By May 21st she measured exophoria 4.5; right hyperphoria 4; left cataphoria 4, and had entire relief from her symptoms while using the patch. Acordingly she was given glasses containing prisms 1.5 base down in right eye and up in left. One month later she reported entire relief from all symptoms even after prolonged near work. "Can not get

along without glasses." She had trouble the first week getting accustomed to the prisms.

This case has more than ever impressed me with the necessity of watching before making a positive diagnosis in heterophorias.

Finally I wish to emphasize the fact that *operations should not be done simply to change measurements but should be done to relieve symptoms.* Proper study of cases should enable one to determine whether or not the muscle imbalance is the cause of symptoms. Once this is established nonoperative treatment should be instituted. If this fails to do good, the patient is at least entitled to know that a *safe operation* done on the *right muscle* will do no harm and in practically all cases will secure good results. The man who fails to give his patients this chance or who goes so far as to warn them against muscle operators is in my opinion not practicing his specialty fairly either to his patient, to himself or to those specialists who are trying seriously to relieve this class of cases.

REMOVAL OF FOREIGN BODIES FROM THE EYE.

FRANK ALLPORT, M. D., F. A. C. S.,

CHICAGO, ILL.

This paper discusses practical points with reference to the diagnosis and removal of foreign bodies lodged in the eyeball, using the publication of McReynolds' views as an occasion for the expression of his own.

In the September 13th Number of the A. M. A. Journal appears an article by Dr. John O. McReynolds of Dallas, Texas, on foreign bodies within the eyeball. McReynolds' review of the situation is excellent, and takes into consideration almost all ordinary aspects of this interesting and diversified subject. There are, however, some views expressed by Dr. McReynolds that it might be serviceable to discuss with him, and this is the purpose of this review.

DETECTION BY X-RAYS. McReynolds speaks of objects being so small as to be unnoticed by the X-ray. It would hardly be wise to positvely challenge this statement, but the writer of this review believes he has never seen this opinion verified; altho his experience is somewhat extensive in this particular line of work, and he has removed steel particles from the vitreous so small as to be almost invisible to the naked eye. He has, of course, been deceived, as has probably every eye surgeon, in the X-ray findings; but it has probably never been on account of the size of the foreign body. It has been on account of a poor picture, or an unfortunate head posture, concealing the object behind a piece of thick bone, or an inacurrate X-ray reading; but probably never, as has been said before, on account of the size of the object.

McReynolds refers to those puzzling cases where the missile has passed completely thru the eye, and lodged in the socket behind the globe. Of course, where it is positively ascertained by the X-ray, orbital measurement, and the localizer, that the object is in the orbital tissue, it can, unless excessive inflammatory conditions exist, be safely left pending future developments. But there are puzzling cases, where the object has just passed thru the posterior sclera and is entangled in the tissues immediately connected with the eyeball. In such instances it is often difficult to determine whether the object is inside or outside the scleral structure, which of course involves the question of operation. The writer has, in such doubtful cases sometimes, made use of what might be termed a moving picture—that is, he has had the patient move the eye two or three times during the

exposure, to ascertain whether the object moved with the eye or not, and if so the extent of the excursions. If movement was obtained, it indicated at least close proximity of the object to the eye and the wider the excursion the closer the proximity. Of course, this is not positive evidence, but it is, after all, evidence, and may assist in the decision of a doubtful case. Almost all cases can be decided by a careful examination of a good profile and a front view X-ray picture, assisted, where necessary, by exact localization.

McReynolds brings up the old question as to the tolerance of small particles within the substance of the lens. Doubtless the lens is quite tolerant of small objects for a while, but after a while lens tissue harboring a foreign body absorbs, and trouble is bound to ensue. After all, why should the object not be removed at once, and thus minimize the danger. The writer is quite certain that no ophthalmic surgeon of experience would allow a foreign body to remain in his lens, if he was confident it could be removed by a magnet, or a cataract operation, or both. Therefore, while it may be assumed that the lens tolerates a foreign body with some degree of patience, the writer feels that all intraocular objects, whether in the lens or elsewhere, should be removed immediately if possible. The longer such objects are allowed to remain, the more dangerous they become, whether, as McReynolds states, they are covered with plastic exudate or not. Any other policy is dangerous in the extreme, and should not be regarded as safe ophthalmic surgery.

Nonmagnetic Bodies. Of course, when the removal of intraocular foreign bodies is referred to, we mean, in reality, magnetizable steel objects. All other fragments present difficult and almost impossible conditions. Such foreign bodies may include nonmagnetizable steel and iron, glass, copper, brass, wood, etc. If such objects are in the anterior chamber, or iris, they may usually be removed by forceps, an iridectomy (containing the foreign body) etc. If the object is in the lens, the lens with the object may be removed by what becomes practically a cataract operation. But, if objects, uninfluenced by the magnet, are posterior to the lens then their removal becomes a very difficult and extrahazardous operation, and will not be referred to in this review. It is an entirely different subject.

The experience of the writer agrees with McReynolds when he speaks of the infrequency of actually observing glass within the eye. The writer can truthfully say that after many years of fairly extensive experience in traumatic ocular surgery he has never actually seen a piece of glass in the eye or conjunctival sac. He has had many cases referred to him, where the eye has been cut, and where the surgeon rendering immediate first aid has said that he has removed glass or some friend has removed glass, but he has never actually seen glass himself. The writer believes that actual glass injuries, especially severe ones, are very rare.

The Hand Magnet. The writer also agrees with McReynolds in his avowed preference for the Sweet hand magnet. He has never seen the Haab magnet remove steel where the Sweet magnet failed. He, therefore, regards the Sweet magnet as sufficient, and much easier handled. It becomes quite hot in a short time, however, and to offset this difficulty he covers the magnet with an overcoat of asbestos. Over this, of course, he slips a sterile bag about the shape of the magnet so that it can be safely handled. Of course, it may be possible that if a surgeon follows the directions of Haab and removes practically all fragments thru the cornea, the strong Haab magnet might be necessary to draw an object from the posterior portion of the vitreous chamber. But the writer removes all fragments, posterior to the lens, thru a scleral opening, and the Sweet magnet has proven sufficient for such work as well as in the removal of fragments in and anterior to the lens thru the cornea. The writer cannot understand why all surgeons do not adopt this rule, for it is cer-

tainly safer, better surgery and more logical, all things considered, to remove objects located posterior to the lens thru the sclera than to drag them out thru and over the sensitive and important structures located in the anterior portion of the eyeball. The writer has frequently and emphatically expressed his views on this subject and will, therefore, refrain from expatiating further, except to say that his continued experience has only emphasized his opinions.

Since commencing the use of the Sweet magnet the writer has modified his views concerning the intraocular introduction of magnet points. While he was under the influence of the large clumsy magnets, he became averse to introducing magnet points into the eye, owing to the unwieldy nature of the heavy cumbersome magnets. It seemed like too delicate work for such elephantine instruments. But the Sweet magnet is easily handled and if necessary, the smaller elongated points that come with the magnet may be attached, and carefully introduced inside the eyeball. The writer desires, however, to emphasize that, in his opinion, no point should be introduced inside the eyeball until all other methods have been first exhausted.

After the scleral incision has been made (which should be ample) the short strong point should be introduced into the opening, and as a rule the steel will promptly come out. The magnet should be held, if possible, directly on a line with the long axis of the splinter, as it, of course, comes out much easier this way. If the steel does not present, the point can be held for some time at the opening and the current frequently snapped on and off. If this does not suffice, the wound may be held open by two little demagnetized points that I devised years ago. They serve as minute retractors and are held by the two hands of an assistant and are preferable to the two sutures passed thru the two opposite sides of the incision, to hold apart the wound, as suggested by some writers. The magnet may now be replaced, snapped on and off, etc. If this does not suffice, one of the small elongated Sweet points may be carefully introduced into the eyeball in the direction of the fragment as indicated by the X-ray picture. The writer believes it unwise to introduce magnet points of any kind inside the eyeball more than one, two, or three times, and not then if possible to avoid it. Each introduction means trauma and possible infection and this should always be remembered. The writer believes that delicate magnet points could be devised, that would be much less awkward to handle than scissors or forceps, but it should not be forgotten that the smaller and more delicate point the weaker will be the magnetizing power.

Localization. Concerning the accurate localization of objects, as spoken of by Dr. McReynolds, the writer is convinced that less elaborate localization is usually sufficient for all practical purposes, altho there are occasional cases where more exact localization is highly desirable. He does not wish to be understand as opposing the important localization methods of Sweet and others, but he sincerely feels that if he has access to a clear full face X-ray view and a clear profile X-ray view that he can, in almost all cases, locate the object with sufficient accuracy for any operative procedure. This saves time, expense and trouble.

Operation. In discussing Dr. McReynolds' paper, Dr. Wm. M. Sweet, whose experience in magnet cases is, of course, very extensive, advocates the scleral route for the removal of steel fragments in almost all cases. He makes a cut in the conjunctiva and undermines it in all directions. He then holds the conjunctiva apart, by two sutures, one in each side of the incision, and opens the sclera. The writer prefers his own method, which consists in picking up the conjunctiva near the sclerocorneal margin and making a triangular flap with scissors up to the culdesac. This is undermined by expanding the scissors blades. The triangular flap can then be laid back and a large scleral area will be exposed.

A Graefe knife is then thrust thru the sclera just back of the ciliary region and extended backward to correspond with the size of the foreign body, remembering to make the incision too large rather than too small. After the object has been removed by the magnet the conjunctival flap can be placed in position and held there by two fine conjunctival sutures, placed one at each side of the apex of the flap—the apex itself being too close to the cornea to admit of suturing.

RESULTS. The writer wishes also to refer to Dr. Sweet's timely utterance concerning the ultimate result in many of these cases. They are frequently most disappointing and it often happens that, altho the steel is removed and the eye becomes quiet and vision is well restored, a few months hence the eye will become blind and perhaps have to be removed. Still we frequently retain good eyes and good vision and we must not be discouraged because of occasional poor results. As Sweet remarks, the chief factor in securing success consists (aside from good operating), in early diagnosis, and in the prompt removal of the foreign body. This means the education of laborers and the employers of labor, for most delays originate with them. Back of all this, however, is *"Prevention."* This means well lighted and well ventilated factories, fitted up with accident preventing machinery, goggles, etc. If such things are installed and used, a vast majority of these accidents will not occur, and if prompt and proper action is taken when they do occur, many eyes will be saved that otherwise will be lost.

OPHTHALMIC EDUCATION AND TEXT BOOKS.

CLARENCE LOEB, A.M.; M.D.

CHICAGO, ILLINOIS.

This paper points out certain defects in educational methods, especially as bearing on the study of ophthalmology. It urges the advantage of becoming familiar with disease as symptoms rather than knowing it by names; and suggests a modification in text books that would help in this direction. It was read before the American Academy of Ophthalmology and Oto-Laryngology, October, 1919.

Several articles have appeared in the last few years dealing with the question of Ophthalmic Education. Various admirable suggestions have been made treating of more thoro instruction in the subject of ophthalmology, advocating more attention to it on the part of those responsible for the curricula of medical colleges, and, in general, emphasizing the importance of a knowledge of ophthalmology for a student intending to do general practice. These papers I do not desire to discuss, except to approve most heartily of anything that will improve medical education, and more especially ophthalmic education. But it does not seem to me that these improvements go far enough, or rather, it does not seem that they are attacking the problem from the correct angle. While they would result in improvement, might not greater progress be obtained if somewhat different methods of teaching were employed than those now in use? If we are traveling along a narrow and method-rutted path, is it better to patch up the old one or to survey a new one, if opportunity offers for such a course?

I realize that in advocating a change I am running counter to two great forces; that of the inertia which tends to crystallize methods, and that of the opinions of men of far greater experience in teaching than I have had, men who are honestly convinced that they are obtaining the best results with their present methods. But I submit that they may not be the best men to

observe the defects of the system; that the very fact of their long and successful experience may have brought about a routine that makes them unable to detect flaws that are palpable to one whose viewpoint is somewhat removed. I further submit that the fact that their students are able to pass a creditable examination both at the time of graduation and later before State Boards of Health is no evidence that they are qualified medical practitioners. It is simply proof that they knew the answers to the questions asked, with the presumption that they were equally well equipped to answer any other question, but is no criterion of their future ability in the actual practice of medicine. And I think this contention is supported by the fact that all schools advocate, and many require a year or more of hospital training. If the instruction these students have received in the schools is sufficient to prepare them for the practice of medicine, why is it advisable for them to spend a year or more in a hospital? Evidently, first, to enable them actually to perform or to assist in the performance of operations which they have witnessed or merely heard of as medical students, and secondly, to acquire proficiency in the diagnosis and treatment of medical cases. That is, the schools admit that the theoretic information which they impart must be supplemented by practical work, which their clinics, highly organized and well conducted as they are, do not furnish.

The charge that has always been brought against schools, in general, is that they are too theoretic; that they do not fit their graduates for everyday problems. I think it would be more correct to accuse them of not equipping their graduates to apply promptly and properly the information they have imparted. The student leaves his school with his brain crammed with valuable knowledge, but without idea of how to utilize it. He is like Kipling's ship before it found itself. His mental machinery functions, but there are slips, hesitation and stress instead of a perfectly coördinating whole.

In the Race of Life, we often see the honor graduate fall behind those whom he outranked in the school, and the cause for this, as I see it, is that the latter have learned better how to utilize the knowledge which they acquired. Other factors such as family connections, personality of the individual, and pure accident of course enter into the problem, but I think the former reason will be found most frequently to account for the success of some and the failure of others. What is true of schools in general is true of medical schools in particular. Knowledge alone does not make an instructor; he must have the ability to impart it. Knowledge alone does not make a successful physician; he must have the ability to utilize it. Theoretic acquaintance with a dozen different methods of operating for strabismus is far less valuable to the individual than a time-tried experience with one.

In developing my thesis, I have been, and shall be compelled to refer to medical education in general, for ophthalmic and oto-laryngologic education differs not in character from general medical education, but only in the special methods applicable to the subject, as for example, instruction in the use of the ophthalmoscope instead of the laryngoscope or the stethoscope. Therefore, if what is said of ophthalmic education is true, it is likewise true of oto-laryngologic and general medicinal education, and vice versa.

Medical education is a combination of didactic and clinical instruction: that is to say, the instructor either describes a condition such as cataract, otitis media, typhoid fever, etc., or he demonstrates a case, analyzing its features. I am referring only to the method of teaching the recognition of diseases, that is to say diagnosis.

Of the two methods of teaching, I venture to say that the majority of students prefer clinical instruction, because the case is there before them, and knowledge acquired thru the sense of hearing is supplemented by that acquired thru the senses of sight and touch. The mental picture thus formed is distinct and lasting—sometimes. So

true is this that after a demonstration in the clinic, the student can usually describe the disease as it appeared to him.

But now a curious phenomenon takes place. If a little time is allowed to elapse, so that this image becomes somewhat blurred, and then a similar case is placed before the same student, he will frequently, if not usually, be unable to diagnose it. But if then told that it is a case of cataract, for example, he will proceed to describe it with all of its symptoms. The reason for this, which all instructors have witnessed, is the faulty method of instruction and not the lack of ability of the instructor or the lack of receptiveness of the student. The latter is taught diseases by *name* and not by *symptoms.* His mind focuses upon the fact that cataract, otitis media, typhoid fever or whatever the case may be is a disease characterized by a certain group of symptoms, and slurs over the fact that what actually occurs is that a group of symptoms such as diminution of sight, absence of the fundal reflex, white mass in the pupillary area, etc., makes up the clinical picture of a disease to which we give the name of *cataract.* He may know that these symptoms are present. but he cannot fuse them into a clinical entity, while he is quite capable of analyzing cataract into its symptomatology. In terms of a homely illustration, he puts the cart before the horse, or to use an illustration from our own specialty, he is looking at the image instead of the object.

It might be called hairsplitting to make a distinction between saying that cataract is a disease characteried by a certain group of symptoms, and saying that a certain group of symptoms make up the clinical entity called cataract, but there is a distinct psychologic difference between the two statements. In the former the mental attitude is analytic; in the latter it is synthetic.

If a recent graduate, especially one who is preparing for a State Board examination, is told to examine a case of typhoid fever, for example, he will probably demonstrate all of the symptoms present, or at least most of them, because he has been taught that in typhoid fever certain symptoms are found, and he will know what to look for. But if the same man is given an unnamed case to diagnose, he will hesitate, probably find a couple of symptoms, but will be unable to combine what he has found into a clinical entity, or to search for additional symptoms, because he has not been taught how to do this. If he makes a correct diagnosis, it will usually be a lucky guess. As I said, he knows diseases by names, not by symptoms.

Now, when this student enters into the practice of medicine, either in private practice or as an interne in a hospital, it is the opposite condition which confronts him. The disease comes to him without a name, or if named by the patient, frequently if not usually incorrectly named. The history may or may not be helpful or reliable. He must synthesize instead of analyze, and is handicapped by his inability to reverse his mental pictures. In a hospital, his senior or visiting man can assist him, but "on his own," he has a difficult task even in the conditions easiest to diagnose. He guesses a name of a disease, and then tries to fit the symptoms of the disease he has in mind to the disease he has in front of him. If he fails, he guesses another one, and so on until success crowns his efforts. How much better equipped he would be, and how much easier his task would be if he had been taught first to look for symptoms, second to look for symptoms, and then again to look for symptoms and only when all had been found to combine them into an entity. This he must do sooner or later if he wishes to become a successful practitioner, and how much better it would be for him to learn it in the school, where the responsibility for the patient is on the shoulders of some one else!

The members of this association are physicians of recognized ability, many of them instructors of wide repute, who have been engaged in the practice of our specialties for periods of varying lengths. It can be well assumed that their experiences have been those of a majority of oculists and oto-laryngologists, and that their

opinions will correctly reflect that of our profession as a whole. As men whose first interest is the advancement of our specialties, let me ask the oculists how many of you could immediately and unhesitatingly give all of the symptoms of acute iritis, for example? Probably all. Well and good. Now let me ask another question. Let me pick out one of the symptoms of acute iritis, say circumcorneal injection, and ask how many could as unhesitatingly name all of the diseases in which this symptom appears? I do not mean the diseases in which this symptom appears as one of the cardinal symptoms, as for example acute glaucoma, but the diseases in which this symptom is found, no matter what its importance may be, because we must remember that symptoms do not come to us labeled cardinal or insignificant. Their relative importance is learned only by years of constant study and repeated experiences. I frankly confess that I could not name off-hand more than half a dozen or so, say iritis, iridocyclitis, interstitial keratitis, corneal ulcer, glaucoma, phlyctenular keratitis, and perhaps a couple more. But upon thinking the question over, I find it is present at some time in the following diseases, in addition to those already mentioned—foreign body on the cornea, superficial punctate keratitis, keratitis profunda, descemetitis, staphyloma of the cornea, episcleritis, scleritis, staphyloma of the sclera, burn of the cornea, abrasion of the cornea, wound of the cornea, wound of the sclera, rupture of the sclera, tumor of the iris, iridodialysis, traumatic coloboma of the iris, traumatic aniridia, panophthalmitis, sympathetic ophthalmia and traumatic cataract, and then I am not sure I have named all. Then there are other lesions where this symptom is present as the result of some complicating condition, such as sarcoma of the choroid as the result of a status glaucomatosus, and foreign body in the eye, for the same reason or because of a complicating panophthalmitis.

Now, in order to make a diagnosis of a case that presents the symptom of circumcorneal injection, the oculist must be able to recall almost instantly at least a large part of the above diseases, and if this is sometimes difficult for men who have been in practice for a dozen or more years, and have met these diseases more or less frequently during that time, how much more difficult it must be for a beginner, who has not learned from experience which can be instantly excluded on account of the absence of other equally important symptoms!

It might with justice be asked "How can a doctor have all of these diseases in his mind? Isn't that what text-books are for?" To this I would reply that if our ophthalmic training had been along the proper lines, such a task would be no more difficult than to remember an equal number of symptoms of any one disease. But the student is not taught thus. He is taught to remember symptoms from the names of diseases. No, that statement is not strictly true. He is taught that a certain disease is recognized from the presence of a certain group of symptoms, whereas he should be taught that a certain symptom may indicate the presence of any one of perhaps several diseases, whose further diagnosis must be made by means of the recognition of other symptoms, each of which in turn may be present in more than one disease. Pathognomonic symptoms are rare indeed. By a process of exclusion of diseases in which one or more of the symptoms present are not found, the diagnosis may be made.

As a matter of fact, is that not the way that the experienced physician makes his diagnoses, whether consciously or not? He groups the different symptoms present into a mental picture which recalls a symptom complex which he knows as a certain disease. In doing so, he has mentally excluded disease after disease which one or more of the symptoms present has called up, but which does not correspond to the entity of all of the symptoms. But the point which I wish to emphasize is that he has learned to

do this not in the School of Medicine, but in the School of Experience.

Now as to text-books! A text-book of ophthalmology, in general, consists of a series of descriptions of diseases grouped according to the particular part of the eye which they chiefly or exclusively involve. For instance, a chapter will be devoted to diseases of the iris, altho there is certainly no clinical or pathologico-anatomic resemblance between an iritis, a sarcoma of the iris and a coloboma of the iris. Their only point of relationship is the fact that each primarily affects the iris. There is more danger of diagnosing an iritis as glaucoma than as coloboma of the iris, and it would seem more logical and certainly easier for the student to bracket the former together for purposes of comparison and differentiation. But this is a minor point. Some form of division must be followed, and no doubt equally weighty objections could be urged against any other method.

The description of each disease is more or less roughly divided into five parts: (1) Definition of the disease, (2) etiology, (3) symptomatology, (4) pathologic anatomy, and (5) therapeutics. In addition, there may be a description of the normal anatomy and physiology of the tissue affected, either at the same place or elsewhere in the book. Furthermore, there is a more or less lengthy discussion of refraction and the principles of physiologic optics. The value of the book is directly dependent on the correctness of its statements, the amount of information it contains, and the accessibility of the latter. For mere size is no criterion of value, if the information is so scattered and voluminous as not to be readily comprehended. Now, there is no question that text-books so written are of great value, whether they are small ones for use of students or encyclopedias for more extensive investigation. The objection which I have to urge against all of them is that to make use of them one must know beforehand what disease he wishes to study. If we have a case which we know is glaucoma simplex, for example, and we wish to supplement our knowledge of this disease, they serve the purpose admirably. But if we have a patient complaining of a loss of vision, and we wish to find out what is the matter with him, we can read up on atrophy of the optic nerve, the various forms of neuritis optica, retinitis etc., that is those diseases whose *names* we can recall, but when we have finished with that list we are at a loss. There is no text-book which we can consult that is arranged to show in what diseases loss of vision occurs. It is true that each book has an index to which we can refer. Let us take up one of the best and most popular of the larger text-books and turn to the heading "Vision." We find there are references to "dimness of vision," "loss of vision," and "obscurity of vision," all having the same page number. We find that it refers to amblyopia, amaurosis, and disturbances of vision without ophthalmoscopic changes. The chapter describes well those conditions of which it treats, but it is not what we want: that is to say, it does not give a list of diseases, one of whose symptoms is decrease in sight. What can we do? We can either search thru the book for other diseases causing loss of vision, or we can ask for a consultation with some one who may remember some other disease and thus assist us in arriving at a diagnosis.

Let us be frank! We have all made mistakes in diagnosis, or if we will not confess that, we will admit that we have had cases in which other men, our equal if not our superior in ability, have made mistakes. If you will recall such cases, you will find that the cause of your colleague's failure and your own success was usually that he did not recognize the importance of some symptom. It did not fit in the mental picture he had formed of the disease, and he had dismissed it as atypical or unimportant. You, on the contrary, remembered that it occurred in another disease, which was portrayed equally well by the group of symptoms present, and therefore you were able to make the correct diagnosis. If the

text-books of your colleague had been arranged so that he could have seen at a glance the names of the diseases in which this neglected symptom appeared, he would have been able to make the diagnosis as well as you, because he could have read the descriptions of the various diseases until he found the one which fitted the symptom complex present.

It seems to me that text-books will be incomplete until they consist of two parts, each equally valuable. If I lay more stress on the one than on the other it is because it has been neglected. The first part should describe symptoms and explain their significance, that is, should state in what diseases they are found and what they indicate. For example, by decrease of vision we mean the inability of the patient to read the 6 meter line of the test card at 6 meters distance. Among other diseases it is found in senile cataract, and is caused by the interference of the opaque lens with the passage of rays of light to the retina. The second part of the text-book should consist of the present text-book with all of the information at our command, arranged in a manner that will permit it to be readily grasped and utilized. The present text-books are complete so far as they go, but to consult them, one must have an idea of what he wishes to look up. They are like a dictionary, valuable for one who wishes to look up the meaning of a word, e. g. nystagmus, but of no use to a man who sees certain movements of the eyeball and has forgotten their name.

NOTES, CASES AND INSTRUMENTS

KERATOCONUS CONSECUTIVE TO VERNAL CONJUNCTIVITIS.

Dr. José de J. Gonzalez.

León. Guanajuato, Mexico.

When one is fortunate enough to be the first to make an observation, on publishing it, one feels somewhat afraid of being in error, perhaps not having properly appreciated all the circumstances pertaining to the causation of the fact, or by giving too much importance to a determinate incident.

We felt like that, after having read before the Mexican Ophthalmological Association our first observations of ametropias developed as a sequel of vernal conjunctivitis (see A. J. O. v. 2, p. 233); and even more so, after we claimed that the development of keratoconus, that has such an obscure etiology, was also due to the vernal conjunctivitis, because, how was it possible that nobody else had observed these complications of spring conjunctivitis?

The new cases seen by us every year, of ametropia usually with myopic astigmatism, more or less irregular, in patients that have been under observation for several years, on account of vernal conjunctivitis, have finally given me the absolute certainty that such refractive errors are really caused by the conjunctival disease; as they did not exist in the early stages of it. If no one before had made that observation, it was not due to carelessness, nor lack of sagacity, but because we are placed in very favorable conditions, being in the middle of a very extended region, and the only eye specialist in many scores of miles around, makes it easy to see these patients during consecutive years.

I now have the opportunity to publish a second observation of keratoconus and astigmatism with vernal conjunctivitis. It refers to the same young girl I referred to in a former paper (V Mexican Medical Congress). I did not mention then any corneal complication because at that time there was not any, giving thus a notable certainty to the fact that keratoconus has arisen as a complication of vernal catarrh. Our new observation follows:

A girl of 10 years, living at Lagos de Moreno, State of Jalisco, a place of temperate climate, has been treated since she was five years old, for vernal conjunctivitis limited to the bulbar conjunctivae. There was gelatinous infiltration, of grayish color, well raised near the cornea and surrounding it. Gross vegetations at both ends of the horizontal diameter of the cornea, with few vessels, strong itching and no secretion. The exacerbations begin in the spring, and reach their full strength in the months of July, August and September, about the time I see her every year. In 1918 the recrudescence was very intense, and she had to stay in this city for a longer period than in previous years. She was treated by vaporizations, Verges ointment, cocain and adrenalin, and one radium exposure that provoked intense reaction, but helped very much to reduce the symptoms. Vision was found to be normal, when she was examined as a routine procedure. The patient was emmetropic.

This year, the little patient did not have an exacerbation of the catarrh, but had to be brought to us, on account of rapidly failing vision, and we were surprised to find: O. D. V.=1/10. O. S. V.=1/50.

Refraction, that was emmetropic last year, was now as follows: R. irregular astigmatism, the more myopic meridian being —4 D., and the less myopic —3 D. The left eye shows a myopic astigmatism very high and very hard to determine, on account of its irregularity. The more myopic meridian is —15, and the less myopic is —13 D.

The form of the cornea in the right eye is spherical, and in the left eye is conical and pellucid. Placido's disc reflects upon the right cornea in concentric circles, and from the left cornea

the circles become triangular with sinous sides. It is therefore a keratoconus.

All traces of spring catarrh have disappeared so much so that any ophthalmologist seeing the child for the first time, would not know to what cause to ascribe the myopic irregular astigmatism of the right eye, nor the conical cornea in the left.

Is it possible that the astigmatism in the right eye is only an early symptom of a coming keratoconus in that eye also? Time alone can decide this question. But the keratoconus in the left eye developed in a short time, from December, 1918, to August, 1919. To correct it we have ordered glasses, and instillations of pilocarpin with a compressive bandage. R —4. Sph. ⌒ —1 cyl. Axis 90°. L —8 D. Sph.

I again insist that the prognosis of spring conjunctivitis is always darkened by astigmatism (irregular) or keratoconus, complications which are very serious occurring in youth. Therefore it is important to cure the vernal catarrh as soon as possible in order to avoid the danger of ametropias and corneal deformities. The ophthalmologist should not hopefuly wait for the disease to disappear, as we have evidences that the circumcorneal vegetations really exert some dangerous influence upon the nutrition of the cornea, diminishing its resistance and allowing to some degree its becoming deformed and even conical.

FIVE CILIA IN THE ANTERIOR CHAMBER.

ALBERT E. BULSON, JR., M.D., F.A.C.S.

FORT WAYNE, INDIANA.

According to Würdemann's Textbook on Injuries of the Eye, which perhaps is the most comprehensive work on the subject, cilia in the anterior chamber following accident or operation are rare; and they generally are tolerated for years without causing the least symptoms, though they may give rise to irritation, ciliary injection, photophobia, lacrimation, pain, or to the development of epidermal tumors of the iris, cysts, with subsequent glaucoma, blindness, or loss of the eye.

He quotes Vieweger as having collected twenty-nine cases from the literature, in several of which a number of hairs (in one case 14 cilia) were found. In these cases the hairs enter thru a perforating wound of the cornea, usually at the limbus, and are there seen floating freely in the aqueous or with one end impacted in the wound or its resulting cicatrix. These hairs may be retained for a long time without causing irritation. Müller (Wien. med. Woch. No. 13, 1894) reports one in the anterior chamber for twenty-four years.

Two cases of sympathetic inflammation have been reported from cilia impacted in the anterior chamber—one by Cuvier and the other by von Graefe. Würdemann reports two cases, in which cysts of the iris formed; and he says that as cilia are apt from irritation to give rise to cysts of the iris, they should be removed by corneal incision and extraction by the forceps. From the literature that is available it is evident that cases are comparatively rare, and cases in which more than one cilium is found in the anterior chamber are rarer still. Accordingly, I have felt that a report of the following case may be interesting.

The patient, Mr. G. H., aged 33, an employe of the Berghoff Brewing Company, was first seen on January 3, 1917, following an injury to the left eye by the rebounding of a stiff piece of wire which he was cutting. The patient stated that the vision was completely lost immediately following the injury.

Examination disclosed a triangular wound in the cornea, about five or six millimeters in length, to the inner side of the visual center. There was no prolapse of iris, but the anterior chamber was so full of clotted blood that determination of the extent of the injury to the intraocular structures was not possible. An X-ray examination disclosed no foreign body, and the patient was placed upon an expectant plan of treatment. The blood in the anterior chamber was absorbed slowly, but the

eye continued to be irritable and painful.

On January 15, or nearly two weeks after the injury, the blood and exudate in the anterior chamber had absorbed sufficiently to show some dark streaks across the pupillary area which by examination with the loupe were thought to be cilia, tho the number seemed to discredit that assumption. As the eye was improving slowly the expectant plan of treatment was continued; but on February 3 (exactly one month after the injury) the anterior chamber was sufficiently clear to make certain a diagnosis of five eyelashes, lying across the pupil and resting upon the anterior capsule of the lens and partly upon the lower pupillary margin of the iris.

The patient was advised to have the eyelashes removed, but owing to his desire to have his employers provide him with compensation while off duty, as well as to pay any expenses incident to his operation, and a controversy between the employers and the liability insurance company concerning liability for this compensation, the matter was given no attention until May 2, or four months after the injury, when the patient was brought in for operation, and with a report that the eye had continued to be irritable, with more or less lacrimation and photophobia. At that time the vision was 5/200, the impairment of vision being due to the corneal scar and a very slight cloudiness of the lens, the latter probably being caused in a measure by the irritation produced by the eyelashes which were partly lying upon the anterior capsule.

Under cocain anesthesia a small incision was made at the limbus, and with a pair of Liebrecht's iris forceps five, apparently full length, cilia were removed intact from the anterior chamber, one by one. No undue reaction followed this operation, and the patient not only made an uneventful recovery, but the irritation, with attending photophobia and lacrimation which had existed for weeks, disappeared; and at the last examination the vision was 5/200, or about as good as could be expected in view of the scar tissue and slight cloudiness of the lens. The eye has remained quite up to the present writing, and there has been no development of a cyst or epidermal tumor of the iris, which according to the literature on the subject seems to be one of the possibilities.

UNILATERAL PROGRESSIVE MYOPIA.

ADOLPH O. PFINGST, M.D., F.A.C.S.

LOUISVILLE, KY.

This case, reported before the Louisville Eye and Ear Society, December 11th, 1919, seems to be rather an unusual one.

Mrs. A., age 30 years, a housekeeper with a good personal and family history, was first seen by me in December, 1903, when she was 15 years old. She was attending high school at the time and complained of burning of her eyes after reading for a short time, blurring of type and an occasional headache. Shadow test at this time showed 1.0 D. hyperopia in the horizontal meridian, and 0.5 D. h. in the vertical. The interior of both eyes was normal. In the subjective test, made with the patient fully under the influence of a cycloplegic, she accepted with the right eye +0.75 D. cylinder, axis 105° ⌒ +0.25 D. S., which gave her 20/15 vision. With the left, +0.5 D. cylinder, axis 75° ⌒ +0.5 D. S. vision 20/15. She was given glasses correcting her astigmatism, to be used constantly, with complete relief of the asthenopia.

Three years later she consulted me on account of phlyctenular disease. After recovery from this I found upon casual examination that with her old lenses, which were still comfortable, her vision in both eyes was 20/15—. She was then 18 years old, was living at home assisting her mother in her household duties, and doing but little reading.

I did not see her again until April, 1915. She then gave the interesting history of a gradual impairment of vision in the right eye until it had

become practically useless. Coincident with the impaired vision the eye had gradually turned outward until there had developed a decided divergent squint. At this time the shadow test revealed between 5½ and 6 D. myopia in this eye. A good sized crescent had formed on the temporal side of the optic disc and the macular region was mottled with numerous areas of atrophy and small pigmentary deposits. There was considerable deviation of the visual line outward, and slight exophthalmus. There was no asymmetry of the cranium. With the left eye covered the best vision obtainable in the right eye was 20/200, this with a —6 D. Lens. The corneal curve was unchanged, measuring less than 1 D astigmatism with the ophthalmometer. The lens was evidently in its normal position, and the anterior chamber was of equal depth in every meridian. Tension was apparently normal and alike in both eyes. The left eye showed no change in refraction or otherwise from that originally recorded.

My last examination of this case was made in September, 1919. The shadow showed an increase of 2.0 D. myopia and with a —8.50 D. she had 20/200 vision. In addition to the degenerative changes in the retina noted in 1915 there were several larger atrophic areas near the macula. Quite a large staphyloma had developed. The left eye was still unchanged.

This is a case of acquired anisometropia, the condition of the right eye being one of progressive or malignant myopia due, no doubt, to elongation of the axis of the eye. The possibility of the myopia being due to changes in the conformation of the cornea (keratoconus) or the lens (result of subluxation) could positively be excluded. The cornea had its normal curve, while the equality of depth of the anterior chamber and failure to see the lens edge thru a wide pupil would exclude the possibility of a subluxation of the lens. The anisometropia in this case developed after the 18th year; perhaps after the twentieth; later than is usual for progressive myopia to develop. These cases usually begin between the 12th and 15th years of life.

The development of progressive myopia in one eye while the other remained unchanged in its refraction during a period of sixteen years, is an unusual occurrence. A similar case has never come under my observation nor have I been able to find such recorded in the literature at my disposal. I am unable to offer a reason for its development.

SOCIETY PROCEEDINGS

Reports for this department should be sent at the earliest date practicable to Dr. Harry S. Gradle, 22 E. Washington St., Chicago, Illinois. These reports should present briefly the important scientific papers and discussions.

COLORADO OPHTHALMOLOGICAL SOCIETY.

November 15, 1919.

W. A. Sedwick presiding.

Vernal Conjunctivitis.

J. M. Shields, Denver, presented for Melville Black, Denver, a boy of 11 years, resident in Colorado, who was suffering from typical vernal conjunctivitis; altho after the diagnosis had been correctly made by Dr. Herriman of Alamosa the parents had taken the child to another surgeon, who had been treating the case as one of trachoma. The ocular conjunctiva was somewhat red, the eyelashes glued together with secretion, and the eyes watery, and in a strong light there was marked photophobia. When the lids were everted they were found to be somewhat pale, and the upper one thickly studded with roundish elevations—the so-called cobblestone ap-

pearance. Rubbing the lids together brought out a whitish, tenacious secretion, which had been examined by Dr. W. C. Finnoff, Denver (see below). It was proposed to treat the case with tubes of radium emanation.

Discussion.—W. C. Finnoff, Denver, said he had made smears in the ordinary way from the right eye, and found no eosinophiles. But in smears obtained by rubbing the inside of the left eyelid vigorously with cotton a few eosinophiles were found. They were more numerous than would be found in the normal eye.

J. W. Patterson, Colorado Springs, mentioned a case which he had seen a year previously, in which the boy became very much more comfortable after having the vegetations trimmed off and being given a refractive correction in tinted lenses.

Edward Jackson, Denver, had seen this summer the case which he had treated with radium about a year previously, the last treatment having been in January, 1919. Altho it was not possible to get as much radium as was desired until the last two applications, the patient was recently found to be very much better than he had ever been before (the disease having lasted for many years) but there were still some granules at the ends of the lids. The dose used was 30 to 45 millicuries for fifteen minutes. The tube was wrapped in a couple of thicknesses of lead foil and held in contact with the everted lid for fifteen minutes. Four treatments in all were given. The Colorado Radium Company was now prepared to sell or rent radium emanation in tubes.

Traumatic Staphyloma of the Sclera.

H. R. Stilwill, Denver, again presented the patient shown to this society in December, 1918, on account of traumatic staphyloma of the sclera due to a fall; and referred to in the proceedings of the Colorado Ophthalmological Society as printed in the February, 1919, issue of the American Journal of Ophthalmology, page 153. The eye had not become soft. The region of the staphyloma (into which the iris had been displaced and with which it had become incorporated) was whiter than formerly, and the cataractous lens was more opaque than formerly. There was no discomfort.

Discussion.—J. R. Robinson, Colorado Springs, mentioned that about a year previously he had seen a patient who had suffered a somewhat similar accident, falling with his whole weight upon a drill. About the upper third of the sclera was completely ruptured, a good deal of vitreous was lost, and the eye had to be enucleated.

F. R. Spencer, Boulder, asked whether the case would be improved by cauterization of the bulging sclera with a flat cautery electrode. He did not propose to go right thru the sclera.

G. F. Libby, Denver, suggested that whenever the patient was willing, the cataractous lens should be extracted thru an incision made from below.

Edward Jackson, Denver, would hesitate very much to employ cauterization of such a lesion. On account of the apparent involvement of the iris in the bulging; he believed that there would be danger of opening up channels of infection even with the cautery. It might be the needling would take care of the cataract, the lens apparently having already been partly absorbed.

C. E. Walker, Denver, would be reluctant to interfere in this case, there being a risk of inflammation of the uvea, possibly of a septic character. He had never had much benefit from needling after the age of thirty or so, absorption being so very slow.

Syphilitic Neuroretinitis.

J. A. McCaw, Denver, again presented a woman of 29 years, who had been shown to the society three years previously on account of a syphilitic neuroretinitis. At that time her vision was reduced to R. 15/60, L. 15/80, and there was a right hyperphoria of about 14 centrads, with macropsia in the left eye and photopsias. At the time of the previous demonstration, examination of the fundus of the right eye showed vascular changes especially in

the lower temporal vein, and of the left eye a central choroiditis, with a heaping up of a pearl white exudate immediately below the macula. Mercury by inunction, combined with potassium iodid, had brought the vision of the right eye up 15/30, and that of the left eye to 15/15. The vision had remained the same until about two months ago, when she returned complaining that the upper part of the field of the left eye was dark. The field of this eye showed a defect in the upper half, greater on the nasal than on the temporal side. On one of the lower arteries of this eye was an aneurysmal dilatation of the vessel wall. The right eye showed a retinitis proliferans, and all the vessels in both eyes were greatly enlarged and very tortuous.

Discussion.—Edward Jackson, Denver. This ophthalmoscopic picture is certainly one of extreme interest, and all the more because of the history which we have of the case. The appearance is as much like that of retinal angiomatosis as one can conceive, except that we have not the large clusters of blood vessels. There is marked dilatation of one vein, and enormous dilatation and extreme tortuosity of some of the vessels in the lower part of the fundus. Some of these vessels are as much as twelve diopters hyperopic. To my mind the retina has been greatly thickened here, and to me this is an evidence of syphilitic disease of the retina in a form not often seen. Angiomatosis is not very well understood, but the histories of a number of cases have been carefully investigated without eliciting evidence of syphilis.

J. A. McCaw (closing). There is one question about the treatment, whether to give her neoarsphenamin or not. If the Wassermann test is positive now I think it will be all right to use arsphenamin in this case, altho many men doubt whether arsphenamin is as useful in a late case of this character as in the earlier stages of the disease.

Panophthalmitis from Penetrating Injury.

E. E. McKeown, Denver, presented a boy whose eye had been penetrated by a pen-knife held in the hand of a schoolmate. The knife had passed through the sclera in the ciliary region. Suppuration had rapidly developed in the vitreous, and at the time of demonstration, several weeks after the injury, the pus showed as a yellowish mass behind the lens, and bulging in the wound. The parents objected to the idea of enucleation and the patient was shown for an expression of opinion. The boy had been kept home from school for a week on account of nausea and vomiting, and had for a while been under the care of a physician who told the parents that it was unnecessary to see an ophthalmologist, as the eye would become all right. When first seen by Dr. McKeown, five or six days previously, the lids were very closely matted together with pus. A culture from the pus which discharged from the eye had been found to contain almost a pure growth of staphylococci.

Discussion.—W. H. Crisp, Denver, while feeling that the eye would have to come out, believed that there was practically no risk of sympathetic involvement of the other eye.

H. R. Stilwill, E. T. Boyd, and C. E. Walker, Denver, expressed themselves as strongly of the opinion that the eye should be removed without delay.

Plastic Cure of Symblepharon.

W. C. Finnoff, Denver, presented a man of 26 years who in February, 1918, while in the United States Army, had been operated upon for transplantation of pterygium in the right eye. Nine days after the operation solid silver nitrat had been applied by the army surgeon to the pterygium; and after this the eye was kept bandaged for 21 days. Since May, 1918, the patient had had six operations. When first seen by Dr. Finnoff, he had symblepharon of both eyelids to the pterygium. On November 10 the symblepharon had been loosened from the lower lid, and the conjunctival surfaces held apart for forty-eight hours with a lead plate conformer which was coated with paraffin. The conformer had been tolerated extremely well, and

the result so far was excellent, the patient being relieved of a previously existing very marked restriction of the eye movements.

Discussion.—E. T. Boyd, Denver, thought that the McReynolds operation could be used to get rid of the pterygium in Dr. Finnoff's case after dealing with the symblepharon.

J. A. Patterson, Colorado Springs, believed that the patient would tolerate the conformer much longer; and that it would be very beneficial, both in maintaining the culdesac and in flattening out the pterygium. It would be well to leave the pterygium alone for some time to come, on account of the large amount of scar tissue present. He did not believe that the McReynolds operation could be successfully employed in this case.

G. L. Strader, Cheyenne, Wyoming, described the operation for pterygium formerly done by Dr. Gifford of Omaha. Dr. Gifford used to cut off the pterygium and take a piece of mucous membrane from the lip and transplant it like a Thiersch graft. The only trouble from this operation was that the patient had an exfoliation of epithelium, and about once a week had to put a little cocain in the eye and rub off the exfoliated epithelium with some cotton on an applicator.

W. C. Bane, Denver. This may be a case of a type in which recurrence will come in spite of all attempts at removal. If you wish to transplant the tissue I would advise taking conjunctiva from the other eye. I have not found it desirable to bring down tissue and stitch it over the area left after removal of a pterygium, because of the tendency of the pterygium to grow again.

W. C. Finnoff (closing) said that in operating he found the pterygium to be a dense band of scar tissue and very difficult to cut.

Choroidal Rupture and Hole at Macula.

W. C. Finnoff, Denver, presented a man of 24 years whose left eye had been struck with a baseball in France last March. Since that time the vision had been very defective in the injured eye. When first seen by Dr. Finnoff on August 16, 1919, the vision was R. 1, L. 0.2. Ophthalmoscopic examination showed the temporal side of the left disc to be slightly atrophic. There was a deep pigmented hole in the center of the macula; and about a half disc diameter to the temporal side of the macula there was a rupture vertically about four disc diameters in length. The rupture extended from the retinal epithelium thru the capillary layer and possibly the small vessel layer of the choroid, but not completely thru the choroid, for the large choroidal vessels could be seen.

Corneal and Iridic Tuberculosis.

W. C. Finnoff, Denver, presented a woman 51 years of age who had come to Colorado for her health 20 years previously, and who came to him on August 18, 1919, complaining of hazy vision in the left eye for three weeks, which had cleared up with the exception of small black specks in the field. The left cornea showed several deep-seated corneal opacities in the substantia propria, the right media were clear but the disc slightly swollen and the edges blurred, and the vessels of this eye slightly tortuous. The left media were slightly cloudy and vessels slightly distended. The vision with correction of a fair amount of astigmatism was R. 1.3, L. 1.3.

On September 17 a small round elevated whitish nodule was visible on the pupillary margin of the iris of the right eye, and the right disc was again slightly red and swollen and the veins engorged. The left eye showed slight improvement. The iris condition cleared in ten days under the use of atropin. At the time of demonstration only three opacities remained in the cornea and the eye was much improved. The clinical symptoms resembled tuberculosis. Tuberculin had not been used, but the patient's eyes had improved along with the improvement in the general health.

Discussion: Edward Jackson, Denver, had a patient who showed very numerous mutton fat deposits on the

cornea, but in whom several different tests with tuberculin had so far been entirely negative. X-ray examinations of the teeth also were negative. The eyes were improving under local treatment. In reply to questions Dr. Jackson said that he still felt that mutton fat deposits were suggestive of tuberculosis.

Cholesteatoma Invading the Orbit.

F. R. SPENCER and C. L. LARUE, Boulder, presented a man of 43 years who had been operated upon for a very large cholesteatoma of nasal accessory sinus origin which had extended into the orbit. When the patient first presented himself for examination on February 9, 1916, there was extreme proptosis of the right eye, and the eyeball was much lower than the left. The eyeball was in fact resting on the cheek. V. was R. 5/200 and J. No. 14; L. 15/20-1, and J. No. 1. There was a doubtful history of injury to the right eye twenty years previously. On account of a slight pulsation, and of the presence of varicose vessels, a diagnosis of probable pulsating exophthalmos was made. X-ray examination, nasal examination, Wassermann test, etc., to be followed by an exploratory operation, were all advised and refused.

The patient was next seen professionally in June 1919. The exophthalmos had increased. There was rather severe constant pain in the right orbital region, which was steadily increasing. At the lower corneal margin there was keratitis from exposure. All of the media were hazy. The nerve head was pale. Transillumination of the eyeball was negative. The vision of this eye was only 2/60. There was marked edema of the upper lids with more varicose veins at the outer canthus. X-ray examination showed that the frontal, ethmoidal and maxillary sinuses, as well as the orbit, on the right side were all cloudy. The general physical examination was negative. A probable diagnosis of osteoma was made.

On July 14, 1919, an exploratory operation was performed by a modified Kroenlein method. As the incision was completed a milky fluid came out. A cholesteatoma approximately 7 by 5 cm. in size was removed from the orbit and the frontal sinus, as the floor of the latter was absent. Healing had been slow but uneventful, and only slight exophthalmos remained. The vision of the right eye was 1/60 on September 30, 1919. The condition was believed to be one of secondary cholesteatoma, and it was anticipated that a more extensive operation would be required later.

Ocular Prothesis Upon Enucleation.

E. T. BOYD, Denver, showed a case of enucleation in which a Mules' vitreous sphere had been inserted in Tenon's capsule. Dr. Boyd had used a so-called sponge and the Mules' glass spheres, and the aluminum and fenestrated paraffin balls. The objection he had to the paraffin was that it weighed 31 grains, whereas the aluminum sphere weighed 15 grains and the glass 19. Dr. Boyd described the method which he employed for uniting the wound margins, in case of evisceration followed by insertion of the vitreous sphere. After circumcision of the cornea the ends of the tendons were brought up and united to the conjunctiva. Then the eyeball was eviscerated. The sclera was united in the horizontal line and the conjunctiva in the vertical. The fenestrated aluminum sphere when threatening to come out proved very hard to remove because of the filling of the cavity with tissue.

DISCUSSION.—J. A. Patterson, Colorado Springs, felt that he got excellent motility from stitching the muscles. Dr. Boyd said that of course the muscle tendons were picked up and drawn into relation with the conjunctiva before uniting the edges of the conjunctiva.

G. L. Strader, Cheyenne, Wyoming, had not done a Mules' operation for years, because he found it much more difficult to fit an artificial eye for such cases. In his experience he had never seen the sphere got rid of.

Pituitary Disease.

C. O. EIGLER; Denver, presented a woman who three months previously had had pain in the left eye and forehead when doing close work, and who said her sight began to fail in the left eye at that time. At the present time she had 5/60 vision, raised to 5/20 with correction. The field of vision was very narrow, and was retained above and to the temporal side only. On the nasal side and below there was no vision at all. The vision of the right eye was normal.

DISCUSSION.—G. L. Strader, Cheyenne, Wyoming, had seen the case with Dr. Decker about three months previously, when the patient had about 20/200 vision in one eye, the other being normal. The fields were a good deal contracted. Dr. Strader at that time somehow suspected that the girl was malingering, as at one time her eye got practically normal vision.

Edward Jackson, Denver. The history of the case, the disturbance of vision, was very strongly suggestive of hysteria or malingering. If the left eye were looked at alone, the disc would not be necessarily thought abnormal, but comparing the two eyes the left disc was distinctly paler than the right. There might be trouble about the hypophysis, and this would account for material changes of vision, and also for some mental aberration. There was enough difference between the two discs to justify careful investigation for an organic cause of the patient's symptoms.

Granuloma of the Iris.

J. A. PATTERSON, Colorado Springs, reported the case of a farmer aged 29 years, who had come complaining of failing vision, with a gradual falling off since last winter. There had been no pain in the eye, altho there was a barely perceptible conjunctival redness. The pupil of this eye was smaller than its fellow and was completely bound down by adhesions, and the color of this iris was darker than that of the other. The vision of each eye was 6/15, unimproved, and only faint outlines of the optic nerve could be seen. After partially dilating the pupil with homatropin, it was found that there was great haziness of the anterior capsule of the affected eye. The optic nerve was pale and slightly indistinct at the lower margin.

The patient limped and claimed to be rheumatic, had pyorrhea, and was apparently unacquainted with the use of the tooth brush. A focal infection was therefore considered, this being favored by the quiet character of the disturbance. It was, however, found that the visual field was contracted. The left patellar reflex was sluggish, and no Romberg sign could be elicited. A sudden exacerbation of the iritis occurred, and within forty-eight hours there appeared in the upper part of the pupil a peculiar nodule which daily increased in size, until it reached a diameter of several millimeters. Sharp cross questioning brought the admission that the patient had had a chancre in January last. The nodule was of a reddish brown color, altho the iris was grey. The nodule was traversed by three minute bloodvessels running vertically. But the time of its appearance and the rate of its growth were against the diagnosis of gumma.

DISCUSSION.—W. H. Crisp, Denver, supported the dental etiology in this case. He described a case which he had seen, in a woman of 56 years, in whom a sluggish, intermittent iritis had gone on for seven or eight months under a surgeon in another city, and in whom a granuloma about two millimeters in diameter had developed on the pupillary margin of the iris; the condition having apparently been due to some badly abscessed dead teeth, removal of which had resulted in permanent cure.

Liebreich Ophthalmoscope.

J. A. PATTERSON, Colorado Springs, showed an old ophthalmoscope "nach Doctor Liebreich," who had invented the instrument in 1855. The ophthalmoscope itself consisted essentially of a slightly concave mirror, and the case also contained a small outfit of convex and concave lenses for insertion in the instrument.

DISCUSSION.—Edward Jackson, Denver, said that this form of ophthalmoscope was the first that he had ever bought. The lenses were all concave except one, the convex one being about four diopters, and being used for the indirect method. The others were to give a clear view of myopic eyes. Dr. Jackson believed that this instrument had been the one most widely sold in this country until the perfection of the Loring Ophthalmoscope about 1877. For a number of years the Loring instrument failed to displace the Liebreich, because the former cost $35.00 and the Liebreich only $5.00. Liebreich was one of Graefe's assistants, but left Graefe and went to Paris and afterwards to London. In getting out his atlas of ophthalmoscopic appearances, he got very much interested in the reproduction of colors, and in pigments; and went to the Latin quarter in Paris and studied among the art students there. When he died only a few years ago, he was probably over eighty years of age, and he had not been heard from in ophthalmology for a generation.

WM. H. CRISP,
Secretary.

BALTIMORE CITY MEDICAL SOCIETY, SECTION OF OPHTHALMOLOGY AND OTOLOGY.

November 19, 1919.

DR. A. E. KNORR, President.

"Some Considerations in Interpreting Muscular Imbalance."

Dr. Hiram Woods presented this paper previously read before the Southern Medical Association at its meeting at Asheville, N. C., and to appear in full in the Journal of that Association.

The paper dealt with a consideration of various means of estimating the meaning of muscular imbalance. The writer regarded the balance test as merely showing the muscular tendency without giving clue as to whether the imbalance was due to excessive or defective muscular action; that tests which come nearer approaching natural vision than is afforded by the balance test are needed. These are, first, determination of static refraction with or without cycloplegia (the use of the latter, of course, dependent upon the age and other well known conditions); second, the presence or absence of diplopia with a red glass placed before one eye and the nature of this diplopia; third, the parallax or shutter test of Duane; fourth, individual power of muscles to overcome prisms, so-called duction.

With reference to the latter, the writer thought that attention had been fixed too exclusively upon power of the internal recti to overcome prisms, bases out (adduction). He regarded adduction as only the extent to which one could separate convergence without accommodation at any fixed distance. He preferred the term *positive relative convergence* as used by Donders, Landolt and others. This function could be increased by exercise, two or three hundred per cent in a few minutes and was no index to the real strength of the internal recti. On the other hand, he regarded positive relative convergence as of considerable importance because it should bear a definite relation to abduction or the functional force of the external recti. The latter are supplied by a single nerve and vary normally within only a few degrees. They form a fairly constant basis for estimating the relation of the two horizontal recti muscles to each other. The two vertical recti should be approximately equal.

In prism degrees, the following is the normal relation for 6 meters. Abduction 5° to 7°, below 5° suggesting essential weakness of the externi, especially if supported by the parallax test and homonymous diplopia by the red glass; over 8° is probably excessive and throws an increased burden on the interni unless the positive relative convergence can be developed. The normal relation between these horizontal muscles should be, one to four or five. The prism degree of power of the vertical muscles should be from 2½° to 3° each.

These principles were then applied to certain conditions met in routine practice: 1. Apparently high exophoria (8° to 12°) in the near unassociated with a distance exophoric imbalance. 2. A normal or very slight imbalance, either way, at 6 M. and lack of relief from refraction correction. This can often be traced to an essential weakness of the external recti muscles. The red glass usually shows homonymous diplopia and abduction is as low as 2° to 4°. Occasionally the externi can be exercised up to a workable standard, but, as a rule, prisms bases out are needed. 3. The use of prisms with bases placed vertically. These sometimes are of great help in hyperphoria and again are useless. The guide to their use is not the balance test, but is an excessive power of one pair of muscles. Two cases were mentioned in both of which the balance test showed hyperphoria, but in one the vertical muscles balanced each other with a 1¼° to 2° prisms and in the other one inferior rectus could overcome only 1° prism while the other overcame 4°. It is this difference that should guide us in the use of vertical prisms. 4. Essential muscular asthenia, a condition usually associated with some form of ill health. Its diagnosis is not thru the balance test at all, but an excessively low duction power of the entire group. Stubborn asthenopia is often a symptom and ordinary routine examination of refraction and muscular balance do not afford relief. The prism test of individual muscles is the only means the author knows of reaching a diagnosis.

Dr. C. A. Clapp read a paper upon the **Extraction of Twenty-nine Cases of Steel in the Eye,** which will be published in full in this Journal.

Discussion.—Dr. C. J. Carroll asked Dr. Clapp if he preferred the posterior route in cases of recent injury. In answer, Dr. Clapp said he did prefer the posterior route.

Dr. Alan Woods wished to know if there was much difference in the nature of Industrial accidents from those of War injuries to the eye. He explained the method that Colonel Lister had been using in France, which was the anterior route, and had apparently been a very satisfactory method.

Dr. Downey exhibited a very large piece of steel which had been removed from an eye.

Dr. Looper reported a case of a patient who had been struck in left eye with a piece of steel, puncturing eyeball, imbedded on layer of retina near posterior central part. The accident occurred on April 26, 1917, at which time it was impossible to remove the steel with a magnet by anterior or posterior route, as steel was nonmagnetic. On November 11, 1919, after Dr. Looper had returned from France, patient came into the office to show how nicely his eye was doing. Vision was 20/30 with no apparent ill effects.

Dr. Carroll thought the eyes containing nonmagnetic foreign bodies should be enucleated.

In closing the discussion, he stated that he believes (in answer to Dr. Woods) that these industrial cases differ quite markedly from the military cases, in the fact that practically all are magnetic foreign bodies and that some of them are very large, contrary to the small ones that occurred in the military service and that nearly all of them centered thru the anterior segment of the eye, and even in view of the fact that Colonel Lister stated that all cases should be removed anteriorly; that he felt that the case should be first X-rayed, and preferably removed by the posterior method, altho each case required the utmost surgical judgment in handling.

In answer to Dr. Carroll's inquiry as to sympathetic ophthalmia, he stated that the eyes that were lost were enucleated, and that no sympathetic troubles had developed to his knowledge.

Edward A. Looper,
Secretary.

CHICAGO OPHTHALMOLOGICAL SOCIETY.

October 13, 1919.

Dr. H. H. Brown, President.

Papilloma of the Cornea.

Dr. Edward F. Garraghan presented a man, aged 70. Family history negative. No malignancy in family. Personal history: Married; wife living, good health; has nine children; has worked at stone cutting and has at times had slight injuries to eyes; does not trace present trouble to any particular injury to eye. He noticed a small red spot in corner of right eye 13 months ago which has gradually increased in size until it interferes with his vision. He was first seen by the speaker at the Illinois Eye and Ear Infirmary two weeks ago.

On the nasal portion of the right eyeball he has a large granular looking mass extending from the inner angle of the eye and spreading out beneath the upper and lower lids, but not attached thereto. There is some slight attachment to the conjunctiva but for the most part it is freely movable over his membrane. At the limbus there is a firm attachment, which extends over the cornea for about three-quarters of its entire surface. The growth is pinkish white in color, except a small portion near the lower border which is white. The tumor is very vascular and large vessels may be seen running over the surface of the tumor and thru the bulbar conjunctiva from the inner canthus to the tumor. The tumor has a raspberry-like appearance and is granular in consistence. It is rather soft to touch and bleeds easily when bruised or cut. There has never been any pain, no ulceration nor any enlargement of the preauricular glands.

The vision at present R. fingers 3 feet; L. 18/200. The tumor has all the characteristics of a papilloma which had its origin in the conjunctiva at the inner angle of the eye, and has gradually grown until it involved the cornea. A small section was taken for microscopic examination and the diagnosis of papilloma was made, with the statement that there was not sufficient evidence to warrant a diagnosis of malignant change. The tumor will be completely removed and further miscroscopic examination will be made to ascertain the real nature of the growth.

Correction of Iridodialysis by Operation.

Dr. Albert E. Bulson, Jr., Fort Wayne, Indiana, read a paper which will appear in full in this journal.

Five Cilia in the Anterior Chamber.

Dr. Bulson read the paper published in full, p. 128.

Discussion.—Dr. Robert Von Der Heydt asked the essayist whether he did not use an acute angle keratome which he thought would be advisable in performing such an operation, and whether he had used atropin afterwards.

He would also like to know whether any localized atrophy of the iris had taken place in the reattached zone.

Dr. Charles P. Small said he did not quite understand how the iris was held in place after delivery. He would like to know where the final suture was used.

Dr. Heman H. Brown asked if the areas of the anterior capsule of the lens upon which the cilia had been riding for four months remained as they were at the time of the removal of the cilia, or did they clear up. He thought it was rather unusual for a foreign body to ride upon the capsule of the lens for four months, as irritating as cilia would be, without producing considerable disturbance.

Dr. Bulson, said he considered the case of cilia in the anterior chamber sufficiently interesting to report, from the fact that his first experiences with anything of this kind was where he removed one lash.

In looking up the literature he found that some 29 cases had been reported in the last 75 or 100 years. Several foreign confreres had reported cases, notably von Graefe, Mueller, and other well known ophthalmologists. One case was reported in which 13 cilia were removed. This seemed improb-

able. Just why five eyelashes got in the anterior chamber in the author's case seemed strange enough, considering that the pieces of wire probably was less than one-eighth of an inch in diameter, and the end of the wire made the punctured wound and carried the five eyelashes through the small opening into the anterior chamber.

A foreign body lying on the anterior capsule of the lens will interfere more or less with the nutrition of the lens, and in consequence there was cloudiness as a result of the irritation. This cloudiness apparently has not increased, as the patient's vision remains about the same.

Concerning the cases of iridodialysis, Dr. Bulson said that the corneal incision was made with a small, acute-angled keratome. In the first two cases the incision was made with the ordinary cataract knife, but in those cases the incision was too large. In the first case too large an incision was made because it was necessary to withdraw the bridge of iris in order to fix it. The stitch was carried thru the conjunctiva, thru the iris, and out thru the conjunctiva to anchor the iris, but as might be expected that drew the iris out and distorted the pupil greatly. It did pull the bridge of iris out away from the visual center, and in that respect the operation was satisfactory.

In the second case the incision was made with the ordinary cataract knife, and again he thought the incision was too large. The iris slipped back. After the eye had quieted down another attempt was made to correct the iridodialysis and at that time the incision was made smaller and the bridge of iris fixed in the wound where presumably it remained, tho the patient was soon lost to view.

In the last case a very small opening was made with a sharp pointed keratome. The object should be to make the opening just as small as can be made in order to pass the closed iris forceps thru and get hold of the bridge of iris. The torn edge was pulled slowly up into the wound, and the knuckle of iris was quite sufficient to block the wound where it remained. The pupil was distorted slightly, but as previous to the operation the iris was lying over the visual center and interfering with the vision as well as disturbing the cosmetic effect, the result of the operation was satisfactory to the patient as well as to the operator. The author said entanglement of the iris was usually feared in a wound and yet it happened not infrequently with no resulting harm.

The operation as performed is mentioned in some of the textbooks, as being a risky procedure. He was merely reporting this with the idea of eliciting some discussion. In these cases there was no bad result, and in the case Dr. Wood reported, he did not consider it a very risky procedure.

Up to the present time, outside of a decided discoloration of the iris in that portion which had been detached from its attachment, there had been no marked evidence of any atrophy. The patient's eye was now free from irritation and she had fairly good vision.

Unilateral Proptosis.

Dr. MICHAEL GOLDENBURG reported the following two cases:

CASE I. A man 26 years of age, married 3 years, one child. He has been wearing glasses for the past six years. Vision had always been about the same in both eyes. However, there had always been a slight difference in the size of his eyes as evidenced by the photographs of 3 and 6 years ago. But he is sure that his vision in the right eye was good up to three years ago, when it gradually started to fail. His personal and family history is very good.

Upon examination the right eye was found to be markedly proptosed. Eyelids, conjunctiva, cornea, and anterior chamber negative. Pupillary reaction to light and accommodation good. Tension normal; vision 15/200 with difficulty. Left eye negative in all respects, and vision 15/15.

Under mydriasis the following was noted. Pupil dilated equally and mildly; media, negative; disc apparently small; temporal side well defined; nasal side slightly hazy, not due to exudate, but

as if unable to focus ophthalmoscope perfectly, which the speaker believed was due to its distorted position. The disc protrudes forward about six D. Vessels are clean cut, slightly tortuous, but in direct ratio to the forward position of the disc. There are no evidences of a perivasculitis, or fluid stasis. The fine feathery arrangement seen in inflammation is absent. The forward protrusion of the disc includes more than the nerve head, it also includes the posterior pole of the eyeball, as if something hard was pushing it forward.

It would appear that this degree of hyperopia was artificial. X-ray pictures (flat pictures) disclosed nothing. Two sets of stereos added nothing to our knowledge.

Buphthalmos, Secondary to Ophthalmia Neonatorum.

Case II. A child one year of age. The baby was born at home. The mother does not know if drops were instilled at the time of birth. On the second or third day pus appeared in both eyes. This was treated as far as she knows with argyrol. Bacterial examination made, when the child was three weeks of age, disclosed the presence of the diplococcus of Neisser When six weeks of age the pus disappeared. At this time bulging was already noticed. The child was then treated with two per cent atropin until 9 months of age. For the past three months the child has received no treatment.

Upon examination a leucoma adherens was found of both eyes, with nystagmus. Both eyes were very large and the left much more so. Tension was markedly increased. The anterior chambers were obliterated.

Upon discussing the case with the other men in the service as to what could possibly be done for this child, the treatment first tried was that of reducing the tension with the hope of at least saving the optic nerve and possibly later trying some corneal surgery. Ether anesthesia was used. A conjunctival flap was made with the idea of doing an iridotasis operation. A small keratome incision was then made about two millimeters back of the limbus and an iris forceps was inserted, but the iris was so bound down that nothing could be accomplished. The speaker then went in with a small blunt hook and loosened up the iris which semed sufficient, but still he could not pull the iris out and decided to do an iridectomy. The child made an uneventful recovery. We now have an anterior chamber, the tension is surely lower than the left eye, and the mother is sure the child is able to recognize objects. The nystagmus seems to be somewhat reduced.

Discussion (Case I). Dr. Bulson asked whether there was any limitation to the movement of the eye.

Dr. Goldenburg replied, apparently not.

Dr. George F. Suker asked what the patient's vision was at the present time.

Dr. Goldenburg replied, 16/25 with the correction.

Dr. Oliver Tydings asked what the correction was now.

Dr. Goldenburg replied, 9 1/2 D.

Dr. Bulson asked as to the condition of the vascular system.

Dr. Goldenburg replied, he has no tachycardia; no possible exophthalmic goiter; no Graefe; no Moebius. Three years ago his vision without glasses was just the same as the left eye. The process started about three years ago.

Dr. George F. Suker, stated that inasmuch as the patient still had approximately 20/20 vision and, after carefully scrutinizing the two former photographs of the case, he labored under the impression that the right eye was not at that time in the same position as the left one. Taking this fact into consideration and the clear media the patient has, there was no doubt something could be done. The little swelling of the disc was suggestive of an infiltration, such as one would see in a beginning papilledema. The eyeball can even now be pushed back into the socket without any particular pain. At the present time the

only thing he considered feasible and justified was a modified Krönlein operation so as to have a large field for exploration. He did not think it was feasible to do a canthotomy and explore the orbit in this way as one might do more damage to muscles and increase the proptosis more than it was at the present time. He thought one would be safe in doing a Krönlein; but, the patient should be kept under observation for a considerable time; and, as long as vision could be maintained at the present point without undue suffering or disfigurement, he would advise leaving the eye alone.

Siderosis Bulbi.

Dr. Alfred N. Murray reported the following case of a patient who was boring on a one inch plate of steel with a bit, when some particles of steel flew off. This was on the 6th of January, 1919. At the time, it was recognized at the factory that there was a foreign body in his *right* eye. No attention was paid to the left eye. About the third day after the injury there was a slight irritation of the left eye and some slight blurring of vision. The blurring continued and increased until about the fifth month, when the vision was almost completely gone in the left eye. He could recognize movement of the hand at that time, that is, in June, but since then the vision has been reduced to faulty projection. There has been scarcely any irritation of the eye during this entire period, except for the first few days following the accident. The location of the foreign body was demonstrated by the Sweet chart as being ten millimeters back of the cornea and seven millimeters to the temporal side; therefore, suspended in the vitreous. The X-ray picture showed it to be about a millimeter in all of its diameters. The probabilities are the preliminary loss of vision was due to a slight hyalitis which gradually increased; encapsulation of the foreign body following. In course of time low grade choroiditis developed, followed by lenticular changes which resulted in a total cataract.

The condition of siderosis bulbi is an unusually interesting one, and is seen only with maximum dilatation of the pupil. This case shows very clearly, 13 distinct round, rust-colored spots, corresponding quite well to the position of hours on the dial of a clock, and arranged quite symmetrically. On close examination with the loupe, there are to be seen some fine, irregularly distributed, dust-like spots at the lower part of the lens. All of these spots are underneath the capsule of the lens. They are shown only with full dilatation of the pupil. The lens is cataractous, but it is more or less a diffused cataract, the lens striae not being visible. He has advised enucleation of the eye, on account of the possibility of sympathetic ophthalmia. In this case the siderosis involves not only the lens, but the iris as well. When the pupil is not dilated the iris presents a rusty color, not a normal greenish or brownish color, but what impresses one as a pathologic coloring.

There is no question whatever in the mind of any one after seeing this iris in comparison with the iris of the other eye but that this is a comparatively recent abnormal condition, and not a condition of heterochromia iridis.

The speaker was not able to account for the development of complete cataract in this case, or as to why it should have occurred without direct injury to the lens, unless it developed as a consequence. Assuming the foreign body is seven millimeters to the temporal side, that would bring the point of perforation about the limbus, in which case it would not have penetrated the lens itself, but the zonule—that is, assuming that it flew directly at the eye.

Discussion. — Dr. Brown asked whether there was any pain or inflammation at the time.

Dr. Murray replied, no.

Dr. Harry S. Gradle asked where the foreign body struck the eye and the site of perforation.

Dr. Murray replied, that he could not find the site of perforation. The foreign body was but a millimeter in

diameter. There is no scar in the cornea.

Dr. Gradle asked whether there was any history of previous trauma to the eye.

Dr. Murray replied that there was not.

Dr. Gradle said the spots symmetrically arranged might be the result of a sudden blow on the anterior portion of the eye.

Dr. Murray replied that would not account for the colored spots, and the color of the iris, which was similar to the color of the spots in the lens.

Dr. Gradle said it seemed to him that the coloring of the spots was unusually red for siderosis. He had seen cases of siderosis and the spots were not exactly that color.

Dr. Murray replied, the rust spots could be dark or light. There might be a variation in intensity. The lens was cataractous, which might alter the color by contrast.

Dr. Gradle said they were uniformly red and of hyalin consistency. This might be a superficial observation. He would like to ask Dr. Murray how he made the diagnosis of siderosis and excluded some of the other conditions that might be confounded with it?

Dr. Murray replied, that nothing but siderosis could produce such a picture as this; the siderosis of the iris positively confirming the diagnosis. Hemorrhage could produce that appearance of the iris, but it could not produce these symmetrically arranged spots under the capsule of the lens.

Dr. George F. Suker said he would like to ask Dr. Murray a hypothetical question. Might it not be a case of heterochromia? He agreed with Dr. Gradle that the color was too intense to be siderosis. Might it not be a case of cataracta punctata rubra and the foreign body simply producing a traumatic caratact in addition? Maybe the patient did have normal vision at one time.

He asked this question for the reason that a year ago in May it was his good fortune to examine a soldier who had 20/20 vision, and on dilating the iris he found red spots underneath the anterior surface of the capsule of the lens. This soldier went abroad, and when he returned he had a traumatic cataract. The red spots in the lens of this soldier were identical with the ones seen in Dr. Murray's case. He also had heterochromia. These rust colored spots could hardly result from the dissemination of oxidized iron. For the foreign body was only one millimeter round, and these thirteen or so spots are now larger than a millimeter by a good deal, and it was hardly to be supposed one millimeter of substance could give such numerous oxidization spots. Cataracta punctata rubra is always underneath the anterior capsule of the lens and usually in the periphery. Furthermore, the lens might have been injured because it appeared to him the lens was subluxated from swelling or otherwise, because the anterior chamber was obliterated at one angle. The fact that the iris dilated ad maximum and presented these red colored spots was somewhat unusual unless it was a congenital affair, because in the majority of cases of siderosis bulbi in which deposits have taken place there was more or less immobility of the iris, and more or less localized traumatic iritis, and consequently a destruction of the iris tissue. If the iris was intact he was inclined to believe there was a double lesion, a congenital cataracta rubra as well as a secondary traumatic cataract. From a hasty examination he should take it to be a case of cataracta punctata rubra with a penetrating foreign body causing the secondary conditions. It appears that these rust colored spots in Dr. Murray's case are underneath the capsule, while in siderosis the spots are usually on top of the capsule.

Dr. Robert Von Der Heydt, in referring to the remarks of Dr. Gradle, who mentioned the possibility of a previous blow to the eye, and suggested the condition might be one of "Vossius Ring-clouding," altho he did not use that term, said, "In the latter condition there is a ring of deposit on the anterior lens capsule, composed of blood coagula, iris debris and pigment due to the impact. However, in the case

shown by Dr. Murray we have these spots under the capsule. They are proliferations of the lens epithelium and have taken up the iron oxid. The case is one of siderosis bulbi, the dots a rare manifestation, however clinically recognized and described by many authors, including de Schweinitz and Axenfeld.

Dr. Murray said the history of this case, spoke in favor of siderosis bulbi. In a congenital condition it was not uncommon to have both eyes involved, in the majority of cases. If one found the condition in one eye, he was likely to find it in the other, and to find other earmarks of congenital defects. If Dr. Suker could see the undilated pupil there would be no question whatever that this was a pathologic appearance of the iris and not a heterochromia iridis.

As to perforation of the lens, the localization showed that it must have perforated the zonule. He did not think it would penetrate the lens itself in that location unless it went diagonally thru. Considering the injury and the fact that the man's vision began to blur three days thereafter, and became gradually reduced in five months to hand movement, it certainly speaks for a traumatic condition.

As to congenital cataract he saw no reason why that should show up in five months. The man's vision was normal until the accident. He had never noticed a difference in the color of his eyes. While the speaker wanted to consider every possible aspect of the case, it was still his opinion that the case was one of siderosis bulbi. Since there was a foreign body in the eye as shown and localized by the X-ray, known to be metal, following a definite injury, a certain length of time elapsing between the injury and the development of visible signs so absolutely characteristic of siderosis bulbi, with symmetrically arranged round rust colored spots, seen only when the pupil was dilated to the maximum, he was willing to stake his reputation on the fact that it was a case of siderosis bulbi.

Dr. Suker stated that Dr. Murray had misunderstood him, in that he did not say the case was one of congenital cataract but a cataractous process due to the injury which the man had received. One could have cataracta punctata rubra with normal vision. He had seen three such cases in which the condition was unilateral. The soldier he had referred to was in the Walter Reed Hospital under the charge of Dr. de Schweinitz who studied the case very carefully. The case was considered by Dr. de Schweinitz as a novel one, and the cataract the man had received was the result of concussion. When he saw the iris the year before he had these spots with clear media, and they were underneath the anterior capsule of the lens.

ALFRED N. MURRAY,
Secretary.

ROYAL SOCIETY OF MEDICINE

Section of Ophthalmology.

Wednesday, December 3rd, 1919.

MR. W. T. HOLMES SPICER presiding.

Keratitis Following Injury.

Mr. G. POTTS showed a case of keratitis following an explosion of black powder. The powder had scorched the cheeks and eyes, and nothing could be seen of the conjunctiva or sclera or cornea as separate structures. The boy was placed under cocain, and the sclera and cornea cleared. Improvement was setting in, and the vision of the right eye was 6/6, of the left 1/6.

Retinal Detachment.

Mr. POTTS also showed a patient with detached retina and an unusual condition of the conjunctiva. In 1900 the patient contracted rheumatism while in the South African war, and had frequently had rheumatic attacks since. The eye trouble dated from April, 1914, commencing with iritis in the left eye. The right conjunctiva was thickened and swollen, the sclera edematous and thickened, and had a fatty appearance.

DISCUSSION.—Dr. A. Hugh Thompson thought the signs pointed to a new growth, and that the nature of it was tubercular.

The President said it reminded him of the appearances in some syphilitic cases.

Mr. Potts said he had not had a Wassermann done.

Aneurysm of Cavernous Sinus.

Mr. MALCOLM HEPBURN exhibited a patient with an aneurysmal varix of the cavernous sinus. He brought the case in order to elicit opinions as to whether anything further could be done. The man had had his common carotid tied, and vision in the proptosed eye was at present 6/6, but the patient was troubled with noises in the head. Some people said tying the angular vein, or other prominent vein did as much good as tying the common carotid. He felt skeptical about that, but the man had a dilated supraorbital vein, and he wondered whether anything could be done to that.

DISCUSSION.—Mr. Charles Higgens spoke of a case in which a prominent vessel, not the carotid, was tied and the patient was cured.

Mr. Percy Flemming spoke of five cases in which tieing the carotid was carried out, and in which the hemorrhage was very severe, and in consequence of that experience he advocated withholding anything further unless the case got worse.

Mr. J. H. Fisher said in some cases the carotid was injured in fracture of the base of the skull, while in others the artery might burst spontaneously on account of atheroma, and the treatment followed would depend on which category a case came into. If ligation were decided upon, it was most important that the patient should be kept at rest in bed for a long period after it had been performed. He thought at present such patients were discharged too quickly.

Mr. R. R. Cruise related a case of his own in which several vessels had been tied in the effort to relieve the distressing head symptoms following gunshot injury, symptoms which made the life of the man practically unbearable.

Tumour of Choroid.

Mr. GOULD showed a case of tumour of the choroid.

Restoration of Orbit.

Mr. OLIVER showed a case of gunshot wound in the left eye, leaving a very large orbital cavity, which he reduced to a size to enable it to take an artificial eye by transplantation of rib cartilage.

Ophthalmic Physicians.

Discussion on DR. RAYNER BATTEN'S paper on "The Need for Ophthalmic Physicians for the Advancement of Ophthalmology," read at the previous meeting (see p. 55) was then taken up.

DISCUSSION.—Dr. C. O. Hawthorne said the paper of Dr. Batten was as interesting as it was unconventional. It was unusual, even unprecedented, to see a surgeon clothing himself with sackcloth and ashes. He, the speaker, had said on more than one occasion that a considerable part of the field of ophthalmology required not the art and craft of the surgeon, but the diagnostic and therapeutic methods of the physician, and he had then been severely criticised for the statement. With the general spirit and motive of the paper of Dr. Batten he was in agreement, but he did not quite agree with the proposed name "Ophthalmic physician," and he would equally object to be known as a nonophthalmic physician.

He would not undertake to say whether the cooperation of physician and surgeon in such conditions as conical cornea, detachment of retina and cataract would be fruitful, but that feeling of uncertainty did not apply to cases in which defect of sight was an evidence of nervous disease, cardiovascular disease, diseases of the kidney and of the blood. The symptoms he had in mind were ocular paralyses, disturbances of the pupil, the cycloplegias, optic neuritis, optic atrophy, cases of retinitis, and retinal and other intraocular hemorrhages. Each one of these required the investigating methods of the physician. It was a mere accident which led the patient to go, in the first instance, to the ophthalmologist or to the ophthalmic hospital, and if the cases were to be treated adequately in ophthalmic hospitals,

those institutions must have the requisite equipment, beds, nurses and medical staff. He did not think the position taken up by Dr. Batten in his paper could be challenged: it concerned the good repute of the profession, the progress of scientific medicine, and the welfare of the individual patient.

Mr. Charles Higgens pointed out that the custom, when a general practitioner sent a case to the oculist, was to report the result of his investigation, and state what specialist ought to be seen: while in hospital work the same relegation to the proper man was carried out.

Mr. W. Lang agreed with Mr. Higgens.

Mr. Ernest Clarke said London was the only place which insisted that the staffs of ophthalmic hospitals should consist of fully-qualified general surgeons. The remedy for the present position of matters was, he declared, to urge the ophthalmic students of the future to learn more general medicine: the great need was for the oculist to be able to diagnose the various conditions which had been mentioned, so as to insure the patient getting to the right man. The solution would be found in a broader range of education.

Mr. E. Treacher Collins did not consider Dr. Batten's presentation of the position was either pleasing or true to nature. The speaker sketched the gradual displacement of physicians by surgeons on the staff of the Moorfields Hospital since 1804. Those who had been ophthalmic surgeons to a general hospital knew that much of their time was spent in the medical wards helping the pure physician who had not troubled to learn the use of the ophthalmoscope in the diagnosis of his cases. The present discussion hinged largely on a question of name. Certainly ophthalmic surgeons were called upon to deal with more than surgical cases. As knowledge advanced, there was an inevitable tendency to split it up into departments, and that meant that there were borderline cases which were liable to be overlooked by rigid devotees of one department or the other. It was, therefore, an advantage to have men to take up two branches, constituting a kind of liason between the two. There was really need for an ophthalmic physiologist, for an ophthalmic pathologist, for an ophthalmic mathematician; but the greatest need of all was the complete ophthalmologist, by which he meant the man who was eager to know everything which could be known about any disease in which the eye could be affected.

Mr. A. W. Ormond contended that the London M. D. should be regarded as equally valuable for a post on an ophthalmic hospital as the London M. S. But he would object to ophthalmic staffs being divided into those who operated and those who did no operating at all. The need was for the specialism to be broader, not narrower. He reminded the meeting that surgeons in eye work not infrequently referred cases to the physician fruitlessly. Men should be given more time for the study of the medical side: at present the younger members of staffs were inundated with refraction work.

Mr. Leighton Davies (Cardiff) thought one of the glories of the specialty was that it required a wide view of the field of medicine and surgery. He objected to the suggestion that the ophthalmic surgeon was not capable of investigating conditions revealed in eye trouble. A drawback to the present workers in the specialty was that they had to do the special work after they became qualified, but it had its advantages in a more general medical knowledge.

Professor J. H. Parsons agreed that the chief value of Dr. Batten's paper was the stress it laid on the feeling many ophthalmologists must have that they were not as fully qualified to deal with the medical as with the surgical aspects of their cases. He would go further than the opener, and say the ophthalmologist ought to be able to deal with physiologic optics, and the relationship of ophthalmology to industrial conditions. The essence of the discussion was the breadth of view which should be capable of being

taken, and he emphasized Mr. Collins' point, that those who worked at the specialty were ophthalmologists—neither physicians nor surgeons specially as such. To evolve better ophthalmologists meant that those who entered the ranks would have to study all branches of the two subjects to the fullest degree, and the opportunities for this must be increased: at present they were faulty in many directions.

Mr. A. S. Cobbledick foresaw difficulty in the allocation of cases if both surgeons and physicians were on the staffs.

Dr. Batten briefly replied.

H. DICKINSON.

ABSTRACTS

Lister, A. E. J. Sclerocorneal Trephining by Elliot's Method. Indian Medical Gazette, August, 1919.

Lister regards Elliot's as the best method of "sclerotomy" at present available. He makes his incision exactly like Elliot's in extent; he raises the flap and splits the cornea with scissors; and lays stress on doing both at the same time and not raising the conjunctiva alone when getting near the limbus. He uses a 1.5 mm. trephine, holding that larger scars cause continual lacrimation and irritation. "In such cases the danger of infection passing thru the layer of conjunctiva covering the trephine hole, and causing panophthalmitis, the great and well-known danger in eyes that have been trephined, must be greater than in eyes where a moderate-sized trephine hole has been made."

He finds that if the trephine edge is not quite sharp its cutting powers are enhanced if the globe is fixed more firmly by a second pair of fixation forceps. He prefers removing the disc first by itself and not using it, by grasping it together with the iris, to steady the globe while doing the iridectomy. To avoid blood collecting in the anterior chamber he advises the operator to wait, after excising the disc and iris before replacing the flap, until all bleeding has stopped. Massage to remove the blood is bad in its effects.

If the disc gets into the anterior chamber it should be removed by iris forceps (Hess's are useful), or by irrigation. Irrigation is avoided as a rule, however, as the saline used is only approximate in composition to the normal aqueous. Lister thinks his freedom from iritis may be due to the avoidance of the irrigator, tho he always applies atropin after every operation. Hyoscin and morphia before operation, or chloroform if the patient is very nervous, is advocated. The alteration in the shape of the pupil, which follows the entry of the trephine into the anterior chamber, is said not to occur if the patient is under chloroform.

F. P. M.

Holth, S. Filaria Loa in Orbit and Eyelid. Norsk Magazin for Laegevidenskaben, Sept. 19, 1919.

Holth presented before the Ophthalmological Society at Christiania, a captain of the infantry, who had been infected by the larva of filaria loa while in the Belgian Congo in 1910. The infection occurs thru the sting of an insect of the Chrysops species. The diagnosis had been made by an Italian physician shortly after infection.

Filaria loa is a snake-like organism of 25 to 30 mm. in length and 0.3 to 0.4 mm. in diameter. It inhabits by preference the loose connective tissue under the skin or between the muscles of the extremities where it can wander around even up to a rate of 1 cm. per minute. That it is often found, as in this case, in the tissues of the orbit, is indicated by an older name of "filaria subconjunctivalis." Its presence is suspected by rheumatoid pains, and the diagnosis is made by seeing and removing it. After some years the filaria, unless removed, becomes encapsulated and dies.

In this case it inhabited the left or-

bit, appearing at times under the skin of the eyelids; at one time the captain suffered a severe supraorbital neuralgia of one-half hour's duration immediately after which the filaria showed itself under the bulbar conjunctiva. It was known once to cross the bridge of the nose into the right orbit and return to the left. During long periods it seemed to be quiescent and caused no symptoms. On the 22nd of April it appeared in the upper eyelid, but before the captain reached the office in an hour it had disappeared. It is said that hot applications will serve to coax it out, but such had been tried every morning for some time without results.

D. L. T.

Rasquin and Dujardin. Prognostic Value of the Argyll-Robertson Pupil. Ann. d'Ocul., 1918, v. 156, p. 393.

The authors have always been able to diagnose syphilis in cases showing this sign. It is a sign of syphilis and not tabes or general paresis; is one of the earliest signs of tertiary syphilis, and is very frequently found in cases where this disease is unsuspected. It develops gradually, sometimes rapidly, and once established remains indefinitely.

The examination is made as follows: The patient is placed in a dark room for a few moments, for the purpose of dark adaptation. By means of a concave mirror, light is reflected into the eye from a distance of 50 cm. If the contraction of the pupil is quick and distinct, the reflex is normal. If it is slow and of small extent, the mirror is removed to 1 m., and if at this distance there is no contraction, the reflex is considered abnormal. In testing the convergence, a plane mirror is held 20 cm. from the patient who looks straight ahead while one pupil is illuminated; then he is told to look at the mirror. Or, the plane mirror is held 1 meter from the patient and the light reflected on one pupil while the patient looks straight ahead. Then, he is told to look at a finger held close to his nose.

They examined 232 cases of beginning or typical Argyll-Robertson pupil. There were 6 cases of general paresis, 5 cases of cerebral or spinal syphilis, and 18 cases of proven tabes. In the remaining it was impossible to diagnose the form of the syphilitic affection or to give a prognosis. However, since cases of pure Argyll-Robertson pupil will ultimately develop tabes or general paresis, every case should be submitted to the following procedure:

(1) Bordet-Wassermann test of the blood; treatment according to the intensity of the reaction.

(2) Reactivation in case of a negative reaction.

(3) Lumbar puncture and examination of the fluid for the following points; (a) tension, (b) lymphocytosis, (c) albumin content, (d) globulins, (e) Bordet-Wassermann reaction, with treatment according to the intensity of the latter.

(4) Supplemental, Luetin test.

The reasons for the above are given. 95 cases of Argyll-Robertson pupil with no other manifest symptom of syphilis were examined according to this procedure, resulting in the following classification:

I. Argyll-Robertson pupil with meningeal reaction. (A) Bordet-Wassermann positive, blood and cerebrospinal fluid. (B) Bordet-Wassermann positive blood, negative cerebrospinal fluid. (C) Bordet-Wassermann negative blood, positive cerebrospinal fluid. (D) Bordet-Wassermann negative blood and cerebrospinal fluid.

II. Argyll-Robertson pupil without meningeal reaction but with Bordet-Wassermann positive for blood.

III. Argyll-Robertson pupil without meningeal reaction and with no symptom of active syphilis. (Bordet-Wassermann reaction negative for blood.)

(A) The Bordet-Wassermann becomes positive for blood after reactivation.

(B) The Bordet-Wassermann remains negative for blood after reactivation.

Prognosis. 1. (A) These cases are

the most likely to develop into general paresis or tabes. (B) In this group, there is the possibility of preventing both tabes and general paresis. (C) This group will probably slowly develop tabes. (D) This group should undergo reactivation. The prognosis is favorable. II. There is little prospect of either tabes or general paresis. The disease does not involve the meninges. III. (A) Refer to previous series. (B) As far as our present knowledge goes, these patients are cured, but should be watched.

C. L.

A. Grünbaum. Representations of Direction and Eye Movements. Weekbl. v. Geneesk., June 7, 1919.

If somebody with a not too dull imagination is asked to imagine an object (with closed eyes), for instance, a red ball, he will answer regarding the place of location: "in front of me," or "to the right" or "left," etc. The visual representations "appear" therefore in these cases, as if they were ranged in the "objective" space, in which we also localize our observations. In the psychology and psychopathology of today exists a very general opinion, that the subjective space, in which our representations appear, is something entirely different from the space of our observations.

It would be entirely inexplicable for a physiologic theory of the representations if the reproduced representations, which go back to observation, show a general spatial quality, which is different in principle from the observed, and still has to be brought back to it. If the subjective and objective space were entirely different things, it would be inexplicable, how true hallucinations, centrally originated ideas, are still localised in objective space. Such theoretic questions demonstrate the fundamental significance of the question of the essence of the subjective space.

A. Grünbaum, a teacher of physiology at Amsterdam wishes to solve the problem not along the introspective route, but with more objective experimental means. He started from the following consideration: The objective space is determined, because the observed objects are localised around the body I, egocentrically, to the right, up, etc. We can also localise the representations of the imagination egocentrically, which common self-observation teaches. The egocentric localisation is in a certain way bound with the corresponding ocular movements during observation; which are therefore signs of the momentary fixed adaptation with the objective space. It had therefore to be investigated, if with egocentric adaptation in subjective space of objective signs of ocular movements. If this is so it may be concluded with great probability, as adaptation to objective and subjective space shows itself in the same manner that both in principle are of the same nature, and in any case are not widely separated.

Grünbaum's experiments were thus conducted. The person was asked to conceive or represent optically as distinctly as possible, when directed "cross to the left," or "circle up" as the object in the indicated direction. With fixed normal head-position the eventual eye-movements were observed with closed and open eyes thru a telescope. The observer chronographed the moment, when the instruction was given, and the moment when the eventual eye movements began. The subject marked when good localised representation was present.

All persons experimented on made constantly eye movements in the direction corresponding with the instructions, before the localising of the representations.

With increasing reaction-times for the eye movements, increase correspondingly the reaction-times for the localised representations.

If the patient was asked to suppress the eye movements, but for the rest to do as in the foregoing experiments, he complained about the subjective difficulties of the localisation, and also of the representation of the object itself. Objectively, in all cases, where no distinct eye movements appeared,

a nystagmus or a series of interrupted eye movements was observed. The suppression of the eye movements had to be done by fixing of an imaginary point, or by staring in front.

If one may conclude about the psychic nature of the subjective space, from this objective connection between the eye movements and the localisation in the representations, we can accept, that the space in which our representation appears to be located, is itself not a reproduced representation, but coincides with the only space known to us, namely that of our observations.

Grünbaum hopes to have demonstrated, that even principal questions of psychology, which seemingly belong to the exclusive domain of introspection, can be brought nearer to their solution by objective experimentation.

E. E. B.

Coulomb, Dilatation of Orbit in Preparation for Prothesis. Ann. d'Ocul, 1919, v. 156, p. 344.

The author says that after a normal enucleation, the oculist has to choose between a prothesis which fits then but is subsequently too small, and one which is at first too large but which later will probably be of the right size, altho in the meantime it has fit badly and produced irritation This can be obviated by previously dilating the cavity by a series of inserts of increasing sizes. These may be made of glass, vulcanite, a cast of the cavity of paraffin, or crown composition, or a reproduction of the cast in soft or vulcanized rubber. These should be used over a period of 3-4 weeks. On the other hand, the size of the cavity may be increased by the use of dilators, used gently and of gradually increasing sizes. He reports a case where a considerable increase in size was obtained by the latter method.

C. L.

Ronne, Henning. Determination of Astigmatism in High Ametropia "Hospitalstidende" Vol. 62, p. 933.

The author brings out that in high degrees of ametropia the degree of astigmatism as found by the readings of the ophthalmometer should not be ordered without modification. If the lens could be placed directly on the cornea there would be no call for any modification, but since the correcting lens is carried at a distance from the eye the refraction is changed. In low degrees of ametropia this difference is of no consequence, but in high degrees, it is considerable.

The author presents a mathematical table of corrections based on a distance of 12 mm. between the cornea and the lens to be worn. According to this table, e. g. on a case in which the spherical correction is + 13 D. and the astigmatism by the ophthalmometer is 6 D. the table shows that a cylinder of only 4 D. should be given. In all hypermetropia a smaller cylinder than that found by the ophthalmometer is called for, while in myopia the reverse is true.

D. L. T.

Muñoz Urra. Regeneration of Retinal Tissue. España Oftalmologica. v. 3, p. 125.

The author has proved the regeneration of the retinal tissues, by means of the new formations of axones and sprouts that do not have any special functions, because the functional restoration is not possible. In spite of the surprising efforts made by the axones to regenerate the nervous transmission, this can never be accomplished because the invasion of connective tissue renders those efforts ineffective.

F. M. F.

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METHYL ALCOHOL POISONING.

The newspapers are proclaiming in headlines the fatalities from wood alcohol. The moving pictures are presenting "the barrel that carried death to 70 persons." An educational campaign is going forward on a large scale. It is sensational, but important. Illegitimate liquor was always infamous for its bad quality, but it remained for the "improvement" of methyl alcohol, by removal of its disgusting taste and odor, to furnish a beverage that could equal and surpass ethyl alcohol as a destructive poison. All who have followed the literature of ophthalmology since the publication of the paper of Casey A. Wood and Frank Buller in 1904, (Trans. Sect. on Ophthalmology, A. M. A. 1904, p. 412) have known that still more important than the deaths are the cases of blindness it causes. They found 122 deaths and 153 cases of blindness.

The first reports of the evil effects of wood alcohol used as a beverage were of its causing blindness thru optic nerve atrophy in cases of "poisoning by extract of Jamaica ginger," in which it had been substituted for ethyl alcohol. In one of these cases the manufacturers were sued by a victim for damages, on account of the blindness. They escaped by putting a witness on the stand, who at the close of his "expert testimony," took a good drink of wood alcohol in front of the jury; and, as soon as he could get away, followed it with an effective emetic. In one group of 5, who took part in a debauch, all became blind and one died. One who will recklessly throw away his life by wood alcohol may be no great loss to the community. But to have to support such a person in blindness is a serious calamity.

In the first volume of the Ophthalmic Year Book, methyl alcohol took the leading place among causes of toxic amblyopia; and every year since it has figured in the literature in this connection, and usually with as many reported victims as all other causes of toxic blindness put together. Its dangers are becoming pretty well known to ophthalmologists. But they still need to be urged upon other branches

of the medical profession, and upon the public; until some of the measures for the prevention of such blindness, suggested 16 years ago by Wood and Buller, are more generally put into effect.

The need of calling attention to this subject is the more urgent, because of certain clinical peculiarities of wood alcohol poisoning and blindness. The early period of intoxication is attended with no visual disturbances. The patient may become insensible and recover consciousness and get about again, without any impairment of vision. Or without losing consciousness, he may go several hours or days and seem to be largely recovered from the effects of the drug. Then he usually suffers severe gastro-intestinal irritation, cramps and vomiting, with rapid loss of sight.

This may go on to complete blindness lasting for several days, and then the sight almost always begins to come back. Useful vision is regained, and improvement continues several weeks. Then the vision begins again to decline, and usually goes down until it is as bad as it was in the early part of the attack. But this second loss of vision is almost always permanent, and is not prevented or limited by any form of treatment that can then be resorted to. This clinical course is the most chararacteristic feature of wood alcohol poisoning.

The objective symptoms are not pathognomonic. In the end there is optic nerve atrophy; which may have the appearance of primary atrophy, but generally shows some blurring of the edge of the disc. But at the beginning the changes revealed by the ophthalmoscope may not be striking. Swelling and edema of the nerve head may show neuritis, or may only give an appearance not very different from that often seen in eye strain. Pallor of the disc and contraction of the blood-vessels develop very gradually, and are never so striking as in quinin amblyopia. The field of vision may show a large indefinite central scotoma early; and later always undergoes great irregular and concentric narrowing; but these are not peculiar to this form of disease.

A few cases of relatively slight methyl alcohol amblyopia recover, either spontaneously or under early eliminative treatment. Probably such treatment begun early enough would be quite effective. An efficient emetic, used in the stage of early intoxication might prevent death or blindness in all cases. But very few cases have come under treatment soon enough to give good results.

A man who has been on a debauch seeks to conceal his folly the day after; is slow to go to a physician, and is disposed to say nothing of the cause of his illness. If, as is usually the case, he supposes he has been drinking ordinary alcoholic beverages, he has no reason to think of wood alcohol poisoning, and will go out of his way to conceal the vital facts. In such a case it is essential that the physician be on the alert to suspect at once the nature of the case, and wood alcohol should always be under suspicion in connection with sudden loss of sight, connected with gastro-intestinal disturbances.

Other important facts are, that poisoning may occur thru inhalation, or thru extensive contact of the drug with the skin, or thru the continued ingestion of small quantities. Arising in this way the characteristic clinical picture of acute poisoning is lacking. Headache and obscure nervous disturbances may be the only symptoms that precede loss of sight. The occasions for exposure to it are varied so that the search for the cause must be widely extended. Shellacking the interior of beer vats has caused acute poisoning with blindness and death. In less confined spaces the effects have been headache and malaise. In several cases the alcohol has been used as an external application for "muscular rheumatism," and in one case it was the person who applied the drug, and not the patient, who suffered. Where it has been used in the habit of secret drinking, it may be quite impossible to obtain history; and the diagnosis must be made by exclusion of other causes.

The prognosis is not absolutely bad for cases seen early, but it should always be guarded. We have to deal with a poison, the effects of which continue to develop for a long time, after the taking of it into the system has stopped. It is a poison in which idiosyncrasy plays an important part, some persons being greatly and permanently affected by doses that would not do permanent harm to the majority of people; and it is used secretly in many food preparations, as a substitute for grain alcohol on account of its relative cheapness.

As to treatment it should be remembered: That it is always of utmost importance to get wood alcohol out of the system, at the earliest possible moment. One man escaped where all his comrades died or became blind, because he took raw eggs and vomited freely. Unfortunately the violent vomiting and purging, that mark many cases, occur after the poison has left the alimentary canal, and is acting on the nerve centers. The hot pack, Turkish bath, pilocarpin sweats, free ingestion of water, and possibly venesection and spinal puncture to help drain the drug out of the system, are the promising means at our command to accomplish elimination. But these measures must be resorted to promptly, and pushed vigorously to the maximum compatible with safety. Potassium iodid may be useful over a longer period, but it is doubtful if it has so good an effect here as in metallic poisoning. The intravenous use of sodium bicarbonat for acidosis, and every possible assistance to respiratory excretion, should also be counted as possible therapeutic resources.

E. J.

THE IRIS IN THE NEWSPAPERS.

Syndicated articles, selected for their spectacular aspect of professed scientific subjects, are a popular feature of Sunday newspapers. These are known to the craft as "patent insides," and are published simultaneously in many cities. Particularly as regards medical subjects, imagination has to be strained to find a possibility of truth and seldom is there a probability. Even the medical press occassionally contained farfetched theories; and so staid and conservative a journal as the Scientific American, was caught by a pseudoscientific article on eye strain one year ago. The Literary Digest which exploited the ambrine treatment for burns, errs occasionally, the average newspaper all the time.

One of the most ridiculous manifestations of such medical nonsense has recently appeared under the title of "New and interesting facts from Science and Life." It is supposed that "all parts of the body are represented in defined areas of the iris of the sight organ." A wonderful diagramatic chart, ruled like the spokes of a wheel, sections off the areas of the iris devoted to apoplexy, the ear, neck, lung, spleen, arm, diaphragm, pelvis, knee, kidney, and so on ad absurdum. This is the key to so called "iridiagnosis" for all parts of the body.

Strangely the thyroid gland is recognized but not the adrenal; the axilla and the clavicle are associated. The area of the leg is put in the center of the lower half of the iris, etc. Strange is it that the vast literature of ophthalmology which contains not only the known facts about the eye, but countless unproved or exploded theories as well, considers that the iris is but a muscular and vascular diaphragm; and that its pigmentation has little to do with disease, and there are no spots or segments therein connected with the little toe or the right arm.

In the particular article referred to, Dr. Cabot and the American Medical Association are quoted in the same breath with the great Dr. von Peckzely of Budapest, Hungary, who "discovered these records of nature in the eye when but a boy of ten years of age." The Reverend Niels Liljequist, a Swedish clergyman has made "iridology" his life work. Drs. H. Lahn of America and Anderchon of England, are said to be great "iridologists"—whatever that may mean. Altho "there are more things in heaven and earth,

Horatio, than are dreampt of in thy philosophy" yet "what fools we mortals be;" or would be if we believed what appears in the popular press.

H. V. W.

SPECIAL QUALIFICATIONS IN OPHTHALMOLOGY.

The Council of British Ophthalmologists has recently published a report upon this subject, recommending that universities and colleges provide for a special examination in ophthalmology, for those who propose to devote themselves to this branch of medicine. They also recommend that ophthalmology be made one of the elective subjects, on which men may be examined when seeking the degree, Master of Surgery. Those who seek such special examinations should produce evidence of two years' study of ophthalmology, one of which should have been spent holding recognized ophthalmic appointments.

The diploma in ophthalmology is granted by the University of Oxford only to those who prove: Attendance on a course of clinical ophthalmology in a recognized institution, for twelve calendar months; take the full two months course in the University, with the practical study of the anatomy of the eye and its appendages, including their development, and of physiologic optics and the physiology of vision. The required examinations include dioptrics, diseases of the eye, ophthalmology in general medicine, clinical cases, and ophthalmic surgery. It is evident that some such requirements and examinations are what the Council has in mind, to be adopted and put in operation by other teaching institutions.

This Council is a body that would be unlikely to sanction hasty reforms, or changes that had not been carefully considered. It is composed of all the Ex-Presidents and Presidents of the Ophthalmological Society of the United Kingdom, and of the Section of Ophthalmology of the Royal Society of Medicine, and nine elected members, four from each of the bodies mentioned and one from the Oxford Congress. Its President is Sir Anderson Critchett, its Vice-Presidents, Sir John Tweedy and Priestley Smith, Treasurer, J. B. Lawford and Secretary, Leslie Paton. Every one of its nineteen members is an ophthalmologist of world wide reputation.

When so conservative a body urges a radical departure from the customs of the past, we are safe in concluding not only that the change is needed, but likewise that it will speedily be brought about. In other countries, as in the United States, a different sort of preparation for special practice will be expected, with real evidence that such preparation has been made. Those already engaged in ophthalmic practice, on the old basis, may well consider how best to put themselves in relation to this new attitude toward specialization in medicine and surgery.

E. J.

CORRESPONDENCE.

Stereoscopic Training of Convergence Insufficiency.

To the Editor:

The increased interest in the method of strengthening the power of convergence advocated in "The Stereoscope in Ophthalmology" is naturally gratifying. In the many letters received there is evident a failure to grasp the essential element to success.

It seems to be rather generally thought that a patient may be given a stereoscope and a set of cards and sent home to cure himself. Doubtless much can be accomplished in this way if one has to do with a sufficiently conscientious person, provided explicit directions are given, about the logical sequence in the use of the charts. Most readers seem to have missed the statement, oft repeated in the book, that a phoro-optometer with two revolving prisms, and a clip to hold the charts is absolutely essential. With this apparatus office treatments should be given two or three times a week. The prismatic element is insinuated by the decentration of the +10. spheres while the patient watches the fused

image. His progress can thus be noted and the home work intelligently directed. No one has tried this treatment with the phoro-optometer stereoscope without becoming enthusiastic in its use.

DAVID W. WELLS.

Boston.

NEWS ITEMS

Personals and items of interest should be sent to Dr. Melville Black, 424 Metropolitan Building, Denver, Colorado. They should be sent in by the 25th of the month. The following gentlemen have consented to supply the news from their respective sections: Dr. Edmond E. Blaauw, Buffalo; Dr. H. Alexander Brown, San Francisco; Dr. V. A. Chapman, Milwaukee; Dr. Robert Fagin, Memphis; Dr. M. Feingold, New Orleans; Dr. Wm. F. Hardy, St. Louis; Dr. Geo. F. Keiper, LaFayette, Indiana; Dr. Geo. H. Kress, Los Angeles; Dr. W. H. Lowell, Boston; Dr. Pacheco Luna, Guatemala City, Central America; Dr. Wm. R. Murray, Minneapolis; Dr. G. Oram Ring, Philadelphia; Dr. Chas. P. Small, Chicago; Dr. John E. Virden, New York City; Dr. John O. McReynolds, Dallas, Texas; Dr. Edward F. Parker, Charleston, S. C.; Dr. Joseph C. McCool, Portland, Oregon. Volunters are needed in other localities.

DEATHS.

Dr. Lewis White Callan son of Dr. Peter A. Callan, died at the Yale Club, New York City, January 21st, of pneumonia, aged 43.

Dr. Warwick M. Cowgill, Lincoln, Nebraska, died of acute Bright's disease, December 29th, 1919, aged 61.

Dr. Mary C. Hollister, Chicago, died in Florida, January 2nd, aged 59.

Dr. Christian R. Holmes, Cincinnati, died January 9th, aged 63. His splendid work in the establishment of the Cincinnati General Hospital, and the fusion of the Medical College of Ohio and the Miami Medical College into the University of Cincinnati will remain as an enduring monument to his zealous efforts to promote the interests of the sick and the teaching of medicine in Cincinnati.

Dr. Arthur J. Lance, Portsmouth, New Hampshire, aged 49, died January 4th, from cerebral hemorrhage.

Dr. L. H. Lent, Middleton, N. Y., died at his home October 27th, 1919. He was past assistant surgeon to the Manhattan Eye and Ear Hospital, New York City, and consulting ophthalmologist to the Thrall Hospital of Middleton.

Dr. Charles McIntire, Easton, Pennsylvania, aged 72, died at his home January 4th.

Dr. Charles P. Pinckard, Chicago, aged 52, one of the founders of the Chicago Ophthalmological Society died at his home, January 27th.

PERSONALS.

Dr. J. M. Banister, of Omaha, has been elected to the Presidency of the Nebraska State Medical Society.

Dr. A. E. Davis, of New York, has been elected chairman of the section on Ophthalmology of the New York Academy of Medicine, and Conrad Berens, Jr., secretary.

Dr. Casey A. Wood passed thru Denver on the 22nd of January on his way to California. He was given an informal luncheon at the University Club by Doctors Jackson and Finnoff. Dr. Wood expects to spend the winter at Palo Alto.

Dr. Casey A. Wood delivered an address in Chicago on January 17th, before the Society of Medical History, on "Walter Bailey" the first writer of an Ophthalmic Treatise in English.

Professor Victor Morax, of Paris, is to be the guest of the Section on Ophthalmology of the American Medical Association at the New Orleans meeting, and will present a paper on "The Operation for Cataract in Glaucomatous Eyes."

SOCIETIES.

The Chicago Ophthalmological Society, at its annual meeting on January 19th, elected the following officers for the ensuing year:

President, Alfred N. Murray; Vice President, M. R. Fringer of Rockford; Secretary, Francis Lane; Counsellor, E. K. Findlay.

The seventh annual meeting of the Sioux Valley Eye and Ear Academy was held at Sioux City on January 21st. Papers were presented by Drs. G. F. Suker and A. H. Andrews of Chicago, L. W. Dean and C. C. Bunch of Iowa City, Harold Gifford of Omaha, and others

The January meeting of the section on Ophthalmology of the New York Academy of Medicine presented a program on glaucoma in which Wm. C. Posey and Luther C. Peter of Philadelphia were participants by invitation. Wm. McLean and John E. Weeks of New York presented papers.

The Louisville Eye and Ear Society, at its annual meeting, held a banquet with a full membership of twenty-six present. Dr. Meyer Wiener was the guest of honor and delivered an address on "Focal Infections

and Their Relation to the Eye." Other guests present were Drs. Griffith of Owensboro, Reynolds of Paducah, Carson of Bowling Green, and Bledsoe of Covington. The officers elected were C. T. Wolfe, President; C. Bass, Vice President; Walter Dean, Secretary.

The Chicago Ophthalmological Society took the occasion of its annual meeting on January 19th, to hold a banquet in honor of its most illustrious and best beloved member, Dr. Casey A. Wood, who is retiring from active practice. Over one hundred members of the Society and old time friends of Dr. Wood, both from Chicago and elsewhere, sat at the tables.

The many sided activities of Dr. Wood's strenuous career; as an ophthalmologist, writer, teacher, soldier, ornithologist, etc., were referred to in appropriate speeches by Dr. Lucien Howe of Buffalo, Dr. Harold Gifford of Omaha, Col. Fielding Garrison, editor of the Index Medicus; Dr. Walter R. Parker of Detroit, and Prof. Henry B. Ward of the University of Illinois. Brig.-General Birkett of the Canadian Army, who is Dean of the medical department of McGill University, paid a glowing tribute to Dr. Wood as a man of whom his alma mater was justly proud.

More than a hundred letters and telegrams of congratulation were received by Dr. Wood, among them from Prof. Wm. H. Welch of Johns Hopkins, Geo. E. Armstrong, President-Elect of the American College of Surgeons, Harvey Cushing of Boston, President James of the University of Illinois, etc.

Dr. Wood was one of the founders of the Chicago Ophthalmological Society, and has always been most loyal in its support, and untiring in his efforts to build it up to a high level as a scientific organization. In recognition of his services to the Society, and in appreciation of his worth as a man of high professional attainments and of wide scholastic and scientific achievements, and particularly as a token of the high esteem in which he is held by his associates, the Society conferred upon Dr. Wood a certificate of Honorary Membership in the Society, and presented to him a "Testimonial of Appreciation." The volume, which is bound in seal, contains fifteen pages of parchment, on which the words of the text are embossed and beautifully illuminated. The book also contains the autographs of the members of the Society.

MISCELLANEOUS.

The Florida State Board of Health has appropriated six thousand dollars for the establishment of a trachoma hospital.

The Herman Knapp Memorial Eye Hospital has received a bequest of five thousand dollars, from the will of the late William Saloman, of New York City.

The schools of Hamilton, Ohio, are being inspected for trachoma by Dr. Rose Hopkins, of the State Health Department, in cooperation with the local chapter of the Red Cross. When 3,900 pupils had been examined 104 cases of trachoma had been found.

Dr. Joseph L. Goodwin of the United States Public Health Service, has commenced his work in South Carolina in the treatment of trachoma.

The "Archives d'Ophtalmologie," founded 37 years ago by Panas, Landolt, and Poncet, having been discontinued during the war, resumed publication January, 1920, with the expectation of regular monthly issues. Truc, of Montpelier, Pollet, of Lyons, Frenkel, of Toulouse, and Duverger, of Strasbourg, have been added to the staff. Ophthalmologic society reports, reviews of journals, articles, and original essays will make up the Journal. The watchword since the victorious peace is "To Work!"

The Council of British Ophthalmologists has issued a report on examinations in ophthalmology and recommends that the universities and colleges should provide a special examination in ophthalmology for those who propose to devote themselves to it. Ophthalmology should be one of the optional subjects which a candidate can elect to be examined in for the degree of Master of Surgery of a university, or for the fellowship of a college of surgeons. Before presenting himself, the candidate should have studied ophthalmology for at least two years and held recognized opthalmic appointments for one of these years. The special examination in ophthalmology should be written, oral and practical, and should comprise anatomy, pathology, optics, systematic and clinical ophthalmology and operative surgery.

CORRECTION.

In this journal for November, 1919, an error occurs in the report of a case of high myopic astigmatism by Dr. Clara A. March. On page 818 the sentence beginning on the fifth line should read: "Skiascopy at one meter under homatropin cycloplegia was as follows: Right vertical meridian was neutralized by — 27.sph. Horizontal meridian by — 13.sph. Left vertical meridian was neutralized by — 27.sph. Horizontal meridian by — 12.sph."

OPHTHALMIC LITERATURE

These lists contain the titles of all papers bearing on Ophthalmology received within the preceeding month. These titles are all in English, some of them modified to indicate more clearly their subjects. These subjects are grouped under appropriate heads, the succession of groups being the same from month to month. In the group the papers are arranged alphabetically usually by the name of the author in heavy-face type. After the subject of the paper (Ill.) indicates the number of illustrations. (Pl.) the number of plates, and (Col. pl.) colored plates illustrating the article. (Abst.) shows that it is an abstract of the original article. (Bibl.) tells that the paper is accompanied by an important bibliography. (Dis.) means that a discussion of the subject is published with it. Under Repeated Titles are indicated additional publication of papers already noticed. To secure the earliest possible notice writers may send copies of their papers, or reprints, to 518 Majestic Bldg., Denver, Colorado.

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Cowan, A. Suggestion for New Perimetric Chart. (2 ill.) Amer. Jour. Ophth., v. 3, p. 49.

Elliot, R. H. Diagnosis of the Cause of Certain Eye Conditions in Tropical Countries. Med. Times, London, 1919, p. 119.

Ewing, A. E. Test Objects for the Illiterate. (34 ill.) Amer. Jour. Ophth., v. 3, pp. 5-23.

Moss, L. An Electric Ophthalmoscope. Jour. Roy. Nav. Med. Service, 1919, p. 336.

Pelayo. Diagnostic Value of Diplopia as a Symptom in Ocular Disease. España Oftal., v. 6, p. 21.

Spalding, J. M. Eyesight Testing by Moving Objects. Maine Med. Jour., v. 10, p. 146.

Visual Requirements of Motor Drivers. Lancet, Jan. 3rd, 1920, p. 38. Brit. Jour. Ophth., v. 4, pp. 28-40.

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Hartridge, H. Marginal Aberration of Eye. Proc. Physiol. Soc. London, 1919-20, p. 8.
Physiologic Eye Strain. Proc. Physiol. Soc. London, 1919-20, p. 1.
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Phelps, K. A. Visual Defects in West Point Cadets. Amer. Jour. Ophth., v. 3, pp. 39-40.

Schottenheim, O. Stocks of Frames and Glasses. (1 pl.) Graefe's Arch. f. Ophth., v. 98, pp. 141-151.

Schwenk, P. N. K. Petit Mal Benefited by Proper Correction. Amer. Jour. Ophth., v. 3, p. 65.

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Cantonnet, A. Diplopia. Rev. Gen. de Clin. et de Therap., v. 33, p. 385.

Carson, W. E. Paresis of Right Superior Rectus with Spasm of Left Inferior Oblique. Amer. Jour. Ophth., v. 3, p. 59.

Malagodi, A. Physiology of Oculomotor Apparatus in Man. Riv. de Patol. Nerv., v. 24, p. 99.

Prevedi, G. Nystagmus and Statistics of Amblyopia. Arch. di Ottal., v. 26, pp. 123-136.

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Goldsack, L. C. Osteoma of Orbit. Rep. Oftalm. Hosp. Buenos Aires, v. 2, p. 131.

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